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The Graduate School,

THE

University Record.

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VARIOUS TOPICS.

The one-sixth of a mill act, by its terms, was not to take effect until the State fiscal year 1894, and it therefore left the University without any State provision whatever for the year 1893. After much deliberation, the Legislature concluded that the best means of bridging over the chasm was to enact the following legislation:

AN ACT

Making the Mill tax available for the use and maintenance of the University of Michigan for the year eighteen hundred ninety-three, and every year thereafter.

SECTION 1. *The People of the State of Michigan enact:* That the State Treasurer be and is hereby authorized and directed to pay to the Regents of the University, in the year eighteen hundred and ninety-three, and each year thereafter, in quarterly installments, upon the warrant of the Auditor General, the amount of the mill tax provided for by law to extend aid to the University of Michigan; and that said treasury be reimbursed out of taxes annually received from said mill tax when collected; and said Auditor General shall issue said warrants as in the case of special appropriations: Provided, that in the year eighteen hundred and ninety-three the first and second installments shall be paid together on the first day of July.

This act is ordered to take immediate effect.

Approved May 4th, 1893.

JOHN T. RICH, Governor.

* * *

In the past ten years attention has been called frequently to the desirability of making, for preservation in the library, a collection of the books and pamphlets written by those officially connected with the University, both in the past and the present. Such a collection, it was suggested, would serve both as a memorial of the men, and as a gauge of their literary activity. While the idea was generally approved, no movement was made toward realizing it until a display of such books and pamphlets had been decided upon as a feature of the exhibit of the University at the Chicago Exposition. It was then thought that the interest excited by the exhibit should be utilized for the carrying out of the earlier and more important project. The books exhibited, may therefore, be described the the nucleus of a permanent memorial collection? It is expected that this display will appeal more strongly to the graduates of the University than to others—that it will recall to them to a residence at the University, and ...ded to be books with the personality of the phrase "in what any of these the collection should ...ferently for they must remember that *teaching*, rather ...o are authorship, is the University tradition. Nevertheless, an examination of the collection ...tion show it to be, in more than one direction, a valuable addition to the educational apparatus of the University.

* * *

Interest in the subject of oratory has been rapidly increasing at the University for the few years, and seems to have reached a climax in the victory at Oberlin achieved by Mr. Long over the representatives of the other ...versities comprising the Northern Oratorical League. The plan by which our representative is selected is calculated to bring out the best talent. Members of the several classes who desire the honor of representing the University at the League meeting, must first compete among themselves for the honor of representing their respective classes in the annual University contest. Should more than seven persons enter a preliminary class contest, their productions are first judged on their literary merits, and then the seven marked highest contest for the class position; the Senior classes of the Literary and Law Departments being allowed two representatives each, the Junior classes one each, and the Sophomore class of the Literary Department one. The class representatives having been selected at the February preliminaries, the general contest in University Hall took place March 18. The contest was the best one yet offered by the Association. The productions were all meritorious in a literary point of view, and were delivered with unusual force and effect. It resulted in the selection of Mr. L. G. Long for the first

e, and Mr. J. B. Nelson for the second. By ue of this decision, these two men received e testimonials of $75 and $50, which the Asso- ation offers, respectively, and the honor of rep- esenting the University as orator and alternate t the annual meeting of the League. This eeting was held at Oberlin College May 5, and contest proved to be a close one. The other mbers of the League are Northwestern Uni- rsity, the University of Wisconsin, Oberlin llege, the University of Iowa, and the Univer- f Chicago—the last named institution hav- admitted at the Oberlin meeting with- ge of representation this year. ied to Michigan's representative ry gratifying. Five of the judges gave first place and the sixth one second place, ing a total of seven, the highest possible ng six. No such grade has before been re- ived by the representative of any college in the course of the eighteen years of Interstate Asso- ciation history. This is the second time within three years that this high honor and the accom- ying testimonial of $100 has fallen to the ersity of Michigan.

MOVEMENT TO SECURE MORE UNIFORM REQUIREMENTS FOR ADMISSION TO COLLEGE.

For some years the need of a better understanding as respects the terms of admission to college, between the secondary schools on the one hand and the colleges and universities on the other, has been becoming painfully apparent. In fact, things have been growing worse instead of better. Among the causes of the existing state of affairs two only need be mentioned. On the one hand, the great increase in the number of colleges, particularly in the West, and the growth of the modern studies, have been attended by much multiplication of divergences of college curricula. Wide heterogeneity has come in the room of narrow homogeneity. On the other hand, the work of preparing students for college has been falling more and more, relatively, into the hands of public high schools, which are primarily finishing schools—"people's colleges"—and only secondarily fitting schools, and which respond, as well as the colleges themselves, to the demand for modern studies. Furthermore, the necessity that rests upon the high schools as a class to conduct their pupils who are getting ready for college, and their pupils who are getting ready for the world, over the same road as far as possible, has dissipated much of the attention that was fixed upon the coördination of the two stages of study in the good old days when young men were prepared for college in very simply organized academies and in pastors' studies. Thus, between college tendencies on the one part and high school tendencies on the other, college preparation pure and simple has fared rather hardly. The demands made upon the great high schools of the West, which are called upon to fit students for many colleges, including sometimes all the first-class ones of the country, have been well nigh distracting. It is a state of things that could not go on indefinitely, at least not without an effort being made to correct it.

In 1891 Mr. James H. Baker, then Principal of the Denver High School, now President of the University of Colorado, in his capacity of chairman for the year of its Committee on Secondary Education, submitted to the National Council of Education, then holding its annual meeting at Toronto, an elaborate report on the subject. This report, which may be found in the "Proceedings of the National Educational Association" for the year just named, as well as in the "Proceedings of the National Council of Education," attracted much deserved attention. It closed with the following suggestions:

"That a committee be appointed by this council to select a dozen universities and colleges, and a dozen high and preparatory schools, to be represented in a convention to consider the problems of secondary and higher education, time and place of meeting to be the same as that of the next National Association; and that in the choice of institutions size, age, and standing be considered.

"That, in consideration of the fact that radical changes are slowly wrought, the recommendation be made to consider the problems in order from the minor to the major, as follows:

"a. Recommending a classical preparatory course for general adoption.

"b. Recommending a preparatory course, omitting Greek.

"c. Recommending a standard preparation for scientific schools.

"d. Considering a plan for complete adjustment between secondary schools and colleges, whether on the basis of one course or of several courses, to the end that a good high-school course may become a good preparation for Colleges.

"e. Considering the feasibility of building all university courses upon at least a complete high-school course."

At the Saratoga meeting of the National Educational Association, 1892, there was held, by the procurement of the National Council, a conference of delegates representing some thirty leading institutions, at which the same subject was very thoroughly discussed. As the result of its deliberations, this conference nominated a committee of ten to conduct a more searching and special investigation, with a view to immediate practical results, viz., President Eliot, Harvard University, Chairman; Dr. Harris, Commissoner of Education; President Angell, the University of Michigan; Mr. Tetlow, Master of the Girls' High School, Boston; President Taylor, Vassar College; President Baker, the University of Colorado; President Jesse, the University of Missouri; Mr. Robinson, Principal of Albany High School; Mr. McKenzie, Head Master of Lawrenceville School, New Jersey; and Professor King, Oberlin College. These nominations the Council of Education and the Board of Directors of the National Association promptly confirmed, the Directors also making a liberal appropriation to pay the committee's expenses.

The committee of ten held its first meeting at Columbia College, New York, in November. It reached the conclusion, after full deliberation, to appoint nine conferences to meet at various places at the Holidays, each conference to consist of ten persons possessing expert knowledge of some one study pursued in secondary schools. The subjects intrusted to these conferences were the following, viz: Latin; Greek; English; other Modern Languages; Mathematics; Physics, Astronomy, and Chemistry; Natural History, (Biology, including Botany, Zoology, and Physiology); History, Civil Government, and Political Economy; and Geography, (Physical Geography, Geology, and Meteorology). The questions submitted for discussion, as finally formulated, may be quoted in full; the membership of the several conferences may be found in "The Educational Review" for January, 1893, pp. 97–98.

"1. In the school course of study extending approximately from the age of six years to eighteen years—a course including the periods of both elementary and secondary instruction—at what age should the study which is the subject of the Conference be first introduced?

"2. After it is introduced, how many hours a week for how many years should be devoted to it?

"3. How many hours a week for how many years should be devoted to it during the last four years of the complete course; that is, during the ordinary high school period?

"4. What topics or parts of the subject may reasonably be covered during the whole course?

"5. What topics or parts, of the subject may best be reserved for the last four years?

"6. In what form and to what extent should the subject enter into college requirements for admission? Such questions as the sufficiency of translation at sight as a test of knowledge of a language, or the superiority of a laboratory examination in a scientific subject to a written examination on a text-book, are intended to be suggested under this head by the phrase "in what form."

"7. Should the subject be treated differently for pupils who are going to college, for those who are going to a scientific school, and for those who, presumably, are going to neither?

"8. At what stage should this differentiation begin, if any be recommended?

"9. Can any description be given of the best method of teaching this subject throughout the school course?

"10. Can any description be given of the best mode of testing attainments in this subject at college admission examinations?

"11. For those cases in which colleges and universities permit a division of the admission examination into preliminary and a final examination, separated by at least a year, can the best limit between the preliminary and the final examinations be approximately defined?"

Most or all of the committees appointed to act in view of these instructions held meetings at the Holidays, and nearly all of them, it is understood, have sent forward their reports to President Eliot. It is not now possible for the general committee to meet and discuss and coördinate the reports before the end of the current academic year. While none of the reports have been published, and none could be published with propriety, the impression has gone abroad to some extent that some of the committees, at least, reached conclusions very satisfactory to their members, and the general feeling, so far as it can be focalized, is that the movement bids fair to eventuate in some much needed reforms. Homogeneous requirements for admission to the best colleges may not be reached, even if that be desirable, but it is hardly doubtful that some of the heterogeneity now existing will be swept away.

It is not improper to add that the adjustment [illegible] of secondary education and higher education in

the United States is more difficult than in any other well educated country in the world, although the maintenance of the old adjustment is certainly becoming increasingly difficult in England, and apparently so in Germany. The principal sources of difficulty here, as already intimated, are two in number. First, the multiplication of college courses of study, arising from the widening of the field of knowledge; secondly and especially, the employment of public high schools on a large scale, and particularly in the West, as preparatory schools for college, since these schools are primarily finishing schools for the elementary grades and only secondarily fitting schools. It may be true, as is sometimes contended, that the education which is best for a pupil who graduates from a high school at eighteen or nineteen years of age into a college, is also the best for the pupil of the same age who graduates from it into practical life; but it cannot be claimed that the public, or even educational experts, have unanimously, or even generally, come to that conclusion.

THE GRADUATE SCHOOL.

In earlier issues of THE RECORD there will be found a series of three articles on the development of graduate study at the University. (See June and November, 1892, and February, 1893). In the second of these articles it is stated that the registration of so-called "resident graduates" dates from the year 1867–68, and that the University ceased to give the master's degree in course in 1877. From the first of these dates to 1878–79, the year that the credit system was adopted, 114 such registrations were made. With the year 1878–79 the number of graduate students began slowly to increase, rising from 13 in 1879–80 to 56 in 1892–93, with a total for the period of 413. This growth of interest led the faculty of the Department of Literature, Science, and the Arts in June, 1892, to establish a Graduate School, and to place it under the management of an Administrative Council, which consists of the President and the heads of departments. In the summer vacation following the first Announcement of this school appeared; the second Announcement is now well advanced in preparation, and will soon be ready for distri- [illegible] bution. But partly because THE RECORD reaches a somewhat different constituency, and partly because a kind of matter somewhat different in in character seems to be called for, large space is devoted to the subject of graduate studies in this issue.

The first thing to be stated here is that the Administrative Council has devoted much time to the School throughout the year, canvassing with much thoroughness the questions relating to it that have arisen. These labors led to some changes that the Announcement will make more fully apparent. Publication has already been made of the fact that a thesis is no longer required absolutely as a qualification for the master's degree, but that the requirement is placed in the discretion of the committee having charge of the student's work; also of the fact that graduate study *in absentia* is no longer encouraged, save under quite exceptional circumstances. The Announcement will show that the graduate work of the University has been more maturely considered and more thoroughly organized. The description and coördination of courses, and the levels from which they spring, have been made much more definite and complete. Still further, some new legislation in regard to time and other requirements has been had. It should be added that in preparing this Announcement pains have been taken to smooth the student's way by suggesting courses of study that will run naturally and easily together.

The last observation suggests the most obvious feature of the descriptions of courses that here follow. The professors who have prepared these descriptions, in connection with other things, have given attention to all important topics of choosing and organizing courses of graduate study.

Specialization is necessarily banished from the elementary school; study there must be general and preparatory. Nor can specialization proper find a place in the secondary school. At what stage it should be introduced into undergraduate work, is a controverted question that is here waived; but there is no denying that specialization is absolutely essential to success in graduate work. In fact, it is necessary to prepare for it before the bachelor's degree is conferred. General and discursive graduate study would be a foregone failure. Hitherto the University has required each student to take three [illegible] studies, one major and two minors, the theory being that as much time should be given to the

major as to the two minors; and such is still the rule, except that two studies may be chosen in the same department provided they do not lie proximate to one another. This method leads to the required concentration on the one hand, and is not open to the objection that over-specialization defeats itself on the other. The thesis, when one is required, goes with the major subject.

But a proper limitation of studies is one thing, a proper choice and coördination quite another thing. No student can put forth all his powers for a considerable time on any one subject; there is a reserve of force that only a plurality of subjects will call out. If two subjects are properly chosen, one will be, to a certain extent, a let-up considered with reference to the other. Then some subjeets are congruous and some incongruous, just as some forms of physical activity are congruous and some incongruous. Two subjects are congruous when one fits the mind for the other, or, at least, does not unfit it; incongruous, when the contrary is true. Obviously, studies should be chosen with reference to congruity and mutual helpfulness, in order to save mental power, remembering always that if two subjects are too closely related the mental effect of prosecuting both of them is much the same as the mental effect of prosecuting either one alone. The subject of congruity of studies is one that pedagogists have not sufficiently investigated, and that practical teachers too little understand. It is here stated merely, not discussed. The pages that follow contain some practical solutions, but without reference to the principles which underlie them.

I.

GREEK.

The advanced courses in Greek are open to all who have completed the prescribed work in Greek for the degree of A. B. in the University, or its equivalent. This amounts to about two years of study in the ordinary college curriculum.

Candidates for the master's degree may take Greek either as a major or a minor study, provided they have completed the prescribed courses, or their equivalent, amounting in all to sixteen hours, as laid down in The Calendar. Taken as a major study, the course should include at least sixteen hours of the electives offered for any year as suitable for either graduates or undergraduates. The electives offered this year suitable for a major course are the following: Two courses for training teachers, one in Greek forms and inflections based on the principles of comparative philology, the other in writing Greek prose; two seminaries in Greek tragedy, with a study of the antiquities of the Greek stage; a course in the Greek minor poets; selections from Lucian; some of the legal orations of Lysias and Isaeus; lectures on the history of Greek art; studies in Hellenistic Greek; Aristotle's Athenian Constitution, with a study of the political and legal antiquities of other Greek states. Taken as a minor study, the course should cover about half the work of the major study.

Candidates for the doctor's degree who expect to make Greek one of their subjects, should have attainments representing a year's study in addition to the two years of work covered by the prescribed courses. It is presumed that they have a reading knowledge of German and French, in order to be able to make use of works on classical philology written in those languages. The requirements for a minor in the case of candidates for a doctor's degree will be substantially equivalent to those for a major in the case of candidates for the master's degree, except that a certain amount of private reading of some Greek author will always be required in addition. Candidates for the doctorate who take Greek as a major study will be required also to pursue the study of Greek epigraphy, the Greek dialects, Greek history and archæology, the principles of textual criticism and interpretation, and the history of classical philology, and to prepare a thesis on some topic relating to the Greek language, literature, or archæology, which shall show acquaintance with the sources of information, power of research, and scientific method of treatment.

II.

THE LATIN LANGUAGE AND LITERATURE.

In order to do graduate work in Latin, a student should have at least completed a four years' preparatory course, and the equivalent of the first two years of our collegiate course, which include Livy, Books I. and XXI., reading at sight, Latin writing; selections from Catullus, two plays of Plautus or Terence, Cicero's *De Senectute* and *De Amicitia;* Horace, selections from the Odes, Satires, and Epistles, with studies in Roman Antiquities; the systematic study of Roman Literature, with the reading of selections from representative authors. He should be able to read Latin with considerable facility, and to use German and French text-books and books of reference. A reading knowledge of Italian is also of great value to students who intend to specialize in Archæology.

For students who intend to make Latin their major study, and hope to take the degree of A. M. in one year, a more extended preliminary training is, as a rule, necessary.

Among the courses which a student in his first year may profitably elect are, reading courses which are varied somewhat from year to year: in 1893-94 Lucretius, the Younger, Tacitus, the Satirists, and Pastoral Poetry will probably be offered; two courses in the writing of Latin and the study of Latin style; lectures on the history and methods of the study of Classical Philology. After this preliminary training he may specialize in either of two lines, in Archæology or in Philology.

Lectures on Roman Archæology and on Latin Grammar, and Seminaries in Archæology and in Philology are offered for this purpose. Of great advantage to students in both lines are the courses in Roman Epigraphy and on the Italic Dialects, which are given in alternate years. A seminary course in the Roman historical writers will also be given in 1893–4.

For those students who wish to prepare themselves especially for the work of teaching, a full teacher's course is offered, including many of the courses enumerated above, and ending with the Teachers' Seminary in Caesar, Cicero, and Vergil, with pedagogical practice and discussion.

Graduate students are admitted to the weekly meetings of the members of the Latin Faculty, at which reports are made on the contents of the technical journals bearing on the work of the department.

Graduate students in Latin will find it to their advantage to elect some of the following courses given in other departments: Greek Literature and Greek Antiquities, the courses in Sanskrit, the course in the Elements of Phonetics offered by the Department of English, Roman History and Institutions, History of Ancient and Mediæval Philosophy, and the lectures on the Science and the Art of Teaching.

III.

THE ROMANCE LANGUAGES.

All candidates for the master's degree in this department are expected to have such knowledge of French as is furnished by at least two full years of college work. The difference between the work assigned to those who take French as a major and those who take it as a minor, is simply one of amount of work done. Of all a general knowlege of the history of French literature is required, at least such as is contained in one of the primers, and a more detailed knowledge of the history of some special period. Those who take French as a major will be expected to pursue the study of Old French sufficiently to read the easier literature, such as La Chanson de Roland and Aucassin et Nicolette, and to give evidence by composition of the more detailed study of one or more authors or periods. They are also advised to study Italian or Spanish, or both, sufficiently to read ordinary prose in those languages.

For the doctor's degree a reading knowledge of Italian and Spanish will be required of all candidates, in order that the general principles of the Comparative Grammar of the Romance Languages may be better understood, and from those who are chiefly interested in language rather than in literature a knowledge of the other Romance Languages, Provençal, Portuguese, &c., will be required, and facilities will be given for their study. From all who take French as a major will be required a thesis, either on a literary or linguistic subject, as the case may be, showing capacity to make original research, and knowledge sufficient to make such research profitable.

IV.

GERMANIC LANGUAGES AND LITERATURES.

[illegible] that [illegible] special preparation for the work of teaching German in

It is assumed that most persons who enter upon a special preparation for the

course of graduate study in this department do so with the view of fitting themselves to teach German, either in secondary or in higher institutions of learning. In either case the first pre-requisite is a thorough grounding in modern German, which means the ability to read the language with facility and to write it with grammatical accuracy. Ability to speak with fluency, while very desirable, can not as a rule be expected. The second pre-requisite is a general acquaintance with the history of German literature, and a more particular acquaintance with the important works of Lessing, Goethe, and Schiller. Graduate students who are deficient in any of these requirements will be expected to make good the deficiency by taking the necessary undergraduate courses.

The student who aims to fit himself for the teaching of German in a college or university should be satisfied with nothing less than the best preparation, which includes training in Old and Middle German, as well as in the eighteenth century classics and the language of to-day. Some study of the older cognate dialects, particularly Gothic and Anglo-Saxon, is also desirable. The would-be Germanist should devote himself exclusively neither to linguistic nor to literary studies, but should aim to be well grounded in both. The language and the literature should not be thought of as two distinct specialties, either one of which can be ignored, but as different phases of the same specialty, each of which is necessary to the other.

Owing to the very great differences that manifest themselves in the preparation and in the purposes of graduate students, it is quite impossible to draw up a systematic course of study which could be recommended as best for all. In general, the student who has in view the very best training, as above described, should endeavor to begin Middle High German and, if possible, Gothic, in his undergraduate course. Where this, for any reason, has not been done, no time should be lost in beginning these studies. Gothic is of prime importance for all comparative work in Germanics, and throws as much light upon English as upon German. The courses in Middle High German, as being nearer to the modern language, should precede those in Old High German, and will be found profitable both on linguistic and on literary grounds. Modern German grammar, the teaching of which constitutes a very large part of the work to be done in the secondary schools, can be fully understood only in the light of its historical development. For this reason it is to be desired that the teacher of German should have some acquaintance with the earlier stages of the language.

Of the courses in modern literature offered by Professor Thomas, that in Faust is usually taken by a large class of undergraduates, but special instruction, in the form of seminary work, will be given to graduate students. The course in the history of German literature is also an advanced elective for undergraduates, but is suited to the needs of any one who has never taken a broad survey of German literature in its historical development. This course is a desirable preparation for all advanced work, whether in linguistic or in literary lines. The teachers' course aims to furnish

the secondary schools. It is required for the teacher's

TO U. OF M.

ALUMNI.

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diploma, and presupposes the completion of at least five full courses in German. The work for 1893–4 will proceed along four lines: (1) Study of modern German grammar in the light of its historical development (Brandt's Grammar, with amplificatory lectures); (2) Critical study of selected masterpieces (Goethe's Werther, and Schiller's Brant von Messina for the first semester), with essays in German upon assigned topics; (3) Recitations (in German) from Kluges Geschichte der deutschen National-Litteratur, beginning with Klopstock; (4) Pedagogical lectures (in the second semester) upon methods, aims, and ideals in the teaching of German.

The only course offered for graduate students exclusively is the Goethe seminary, which will be devoted to a study of the poet's early writings with special reference to English influence.

An elementary course in Dano-Norwegian will be given in the first semester, to be followed in the second semester by the reading of Ibsen's Brand. In connection with this study, Professor Thomas will give a short course of free public lectures on the life and works of Ibsen.

V.

HISTORY.

Graduate work in this department is naturally divided into the four following divisions: European History, American History, American Constitutional Law, and Comparative Constitutional Law. It is not desirable that a student should select his major in Constitutional Law unless he has had broad training in history, and is well acquainted with modern European or American history, as the case may be. Any one of these lines of study can be advantageously taken as a minor with any other one as major. A large part of the work of a graduate student must be individual research; and the aim of the more advanced courses is to offer opportunity for self-development rather than instruction. The work in Comparative Constitutional Law as announced, covers three semesters. The courses in later European history are lecture courses, but can be advantageously taken as a basis for or concomitant to research work. All of the more advanced work in American history will be conducted on the seminary plan.

Candidates for the master's degree with European history for a major, who expect to come up for examination in one year, should have had at least a year's work before entering upon their candidacy. Those who take up American history should have had a like preparation, but it is not necessary that this preparatory work shall be in American history, especially if the candidate has a good knowledge of English Constitutional history.

Candidates for a doctorate can materially shorten the time of study by becoming acquainted with historical methods in their undergraduate work. Those who have had the seminary work allowed to advanced seniors, in this University, will have a great advantage, for it is not expected that even the master's degree will be given unless the student has had some training in historical research. In general, the necessary preparation for entering upon studies for the doctorate will not differ from that mentioned above in speaking of the master's degree.

Work in history can be well correlated with International Law, Political Philosophy or the History of Philosophy, Political Economy, and English or American Literature. It is often desirable that the student who has chosen one of the languages for a major, take history for a minor, choosing the field of work so as to supplement his major study. The general courses in Biology will be found to supplement admirably the work of the student who is making a specialty of history or the political or social sciences. Pedagogy is always appropriate and desirable for those who expect to teach the subject which they may elect as a major.

VI.

PHILOSOPHY.

Any student taking a major study in the department of Philosophy for the doctor's degree is required to prepare himself in the outlines of the whole subject, including at least the equivalent of the general course in the History of Philosophy, and the main problems and results of Ethics and Psychology. In addition to this, he is required to pursue some one of the three lines of study: (1) History of Philosophy, (2) Ethics (including Political Philosophy), (3) Psychology.

For 1893-4 the courses in the History of Philosophy will include a general sketch of the subject, three hours per week, running through the year, in addition to which, one hour per week will be given to special study of some one subject, the object being to call attention especially to the methods of investigation appropriate to the subject; three-hour courses for one semester each devoted to the philosophy of Spinoza, to contemporary philosophy, with special reference to Lotze and Edward Caird, to English Psychology from Locke to Mill; a two-hour course on the movement of thought in the 19th century, which, while general in character, may often be taken with advantage by graduate students. In alternate years some of the above courses will be omitted, and in their stead there will be courses in Kant's Critique of Pure Reason, Hegel's Logic, and the history of the philosophy of science from Galileo to the present day. In Ethics, besides the general course, which should in all cases be taken as an undergraduate study, courses are given, generally of three hours each, in Political Philosophy (in connection with which, in 1893-4, one hour a week will be given to a critical study of Green's political thought); in the history of British Ethics, and in Anthropological Ethics, devoted to a study of the origin and early development of ethical ideas and customs. In connection with elementary work in Ethics, a brief course of fifteen lectures will also be given relative to the ethics of charity, crime, and penology. A seminary in ethics is also held with subjects differing from year to year, and affording sufficient opportunity for varied lines of advanced research. In 1893-4, some of the topics for investigation in the seminary will be the ethical psychology of action since the time of Hobbes, and a comparison of the theories, both English and Continental, basing morality

respectively on natural law and on institutional life. In Psychology, besides the work in general psychology and discussion of contemporary systems, special opportunity is afforded for becoming acquainted with the main methods and results of modern scientific research. A laboratory provided with the chief standard apparatus for anthropological tests, analyses of sensations, and psycho-physical research is open to all students specializing in this line. The courses are in the lines (1) of Physiological Psychology, (2) of Psycho-physics and experimental methods, (3) of Comparative Psychology so-called; a study, that is, of the psychology of lower animal forms. As fast as students suitably prepared present themselves, the latter line of study will be developed, in connection with work in Biology, into a study of the method of the evolution of animal intelligence.

Any one of these lines may also be chosen as a minor, in which case a less amount of work will be accepted.

Attention may be called to courses in other departments running parallel with work in Philosophy. In 1892-93, for example, in Greek, an advanced course was given in Plato's Republic; in Latin, courses in Lucretius and Seneca; in French, a course in selections from Descartes, Malebranche, and Condillac, and another in Taine's Intelligence; in German, a seminary course in Schiller's philosophical poems, with special reference to his studies in Kant, Fichte, etc.; in the department of Pedagogy, a course of lectures, running through the year, is given on the history of educational theories.

Whether a major or minor be chosen, special attention should be given to its correlation with the other subjects chosen. The history of philosophy generally falls in either with work in history, or with some field of ancient or modern literature, as indicated above. Courses in Political Science, Political Economy, Constitutional and Comparative Law etc., are appropriate accompaniments to the subject of Ethics. Work in Psychology may be taken collaterally with Biology, Physiology, or Histology. It also forms a natural combination with study of education. As a rule, it is advisable not to vary much from some one of the above combinations.

VII.

THE SCIENCE AND THE ART OF TEACHING.

The courses of instruction given in this department may be divided into the more elementary and the more advanced courses. The first group consists of a course in the art of teaching, four hours, a course in the science of teaching, four hours, and a course in school supervision, three hours. As these courses are all professional, lying apart from the beaten track of college or university study, they may be pursued with interest and advantage by candidates for advanced degrees who wish to fit themselves for teaching, provided they have not already pursued them or pursued them at sufficient length. Such students, who are preparing for superintendencies or principalships of schools, will find the [illegible] course in supervision especially helpful. The more advanced courses are the history of education, ancient, mediæval, and modern, occupying three hours a week for the entire year, the comparative study of educational systems, domestic and foreign, two hours, and a seminary for the study of special topics in the history and philosophy of education, two hours. The unit, unless otherwise specified, is the semester. Students preparing to teach, who have had the elementary instruction, will of course choose their work from this second group of studies. The same may be said of students not fitting for teaching, who choose work in the department for its general or cultural value. The theoretical and critical course may, however, be recommended for the same purpose. The only difference between the candidate for the master's degree and the one for the doctor's degree that need be noticed is, that supplemental private study is given to the second.

As respects coördination with other studies, Pedagogy readily yields to varied combinations. The several courses run smoothly with the more technical subjects, as languages, mathematics, and sciences. Its closest affiliations, however, are with the philosophical studies. Here the closest connections are, in philosophy, with Psychology, Logic, and Ethics; in social science, with Politics and Economics; in history, with literature, philosophy, and institutions. The courses also combine easily and naturally with studies in English.

The objects of this department of the University, as set forth in The Calendar, are to fit students for the higher positions in public school service; to promote the study of educational science; to teach the history of education, and of educational systems and doctrines; to secure to teaching the rights, prerogatives, and advantages of a profession; to give a more perfect unity to the State educational system, by bringing the secondary schools into close relation with the University. Here are general as well as special aims; disciplinary and culture ends as well as practical ends. Apart from its practical uses, Education, as studied reflectively, has large general value. The theory and history of education are an important part of the doctrine and history of philosophy, while educational institutions are closely related to the institutions of politics, religion, and general social life.

VIII.

POLITICAL ECONOMY.

The character of graduate instruction in Political Economy given in the University may be most clearly shown by a report of the work done during the past academic year. In the first semester a course on Economic Theory was given by Professor Adams, in which the leading economic doctrines were subjected to critical analysis, especial attention being paid to the latest phase of the subject as presented by the Austrian School. This course was strictly confined to graduates. Professor Adams also conducted a seminary of graduate students in Finance, in which the question of Public Expenditure received especial consideration. Professor Taylor, in connection with his intermediate course in Currency and Banking, met the graduate students in [illegible] a weekly two-hour session, for the special discussion of topics presented in the lectures, and for hearing

reports from students on questions arranged for special reading.

During the second semester Professor Taylor conducted a course entitled, "Social Philosophy with special reference to Economic Relations." This course of lectures was strictly confined to graduate students. The seminary in Economy during this semester was devoted to a coöperative study of the Railway Problem in the United States, and was confined to graduate and special students, and to undergraduates pursuing their work on the University system. All who worked in the seminary followed the lectures given to the undergraduates on the Transportation Problem, which made the seminary in reality an "extra hour" for this intermediate course. The spirit of scholarly research shown in this seminary was excellent. The scope of the investigation may be seen from the following lists of subjects upon which reports were made:

FIRST LIST.

Gallatin's plan of internal improvements, Mr. Merner.

Interpretation of Cumberland and Maysville Road-bill vetoes, Mr. Brooks.

Sketch of Erie Canal, Mr. Kawada.

Experience of Michigan with railways and canals, Mr. Cooley.

Railways and canals in 1840, Mr. Loeb.

Changes in State Constitutions about 1848, Mr. Smith.

The land-grant system, Mr. Friedman.

The Union Pacific Railway, Mr. Davis.

The Vanderbilt system of railways, Mr. Mullin.

The era of railway brigandage, Mr. Kotegawa.

The Hepburn report, Mr. Dixon.

The Cullom Committee investigation, Mr. Hammill.

SECOND LIST.

Sketch of the Iowa Commission, Mr. Smith.

Sketch of the Michigan Commission, Mr. Kotegawa.

Policy of Interstate Commerce Commission since 1887, Mr. Merner.

Cases affecting long and short haul, Mr. Brooks.

Cases affecting reasonable rates, Mr. Mullin.

Cases affecting through rates, group rates, and export rates, Mr. Kawada.

Cases affecting questions of discrimination, Mr. Friedman.

Question of classification, Mr. Davis.

Railway regulations in foreign countries, Mr. Hammill.

Decisions of courts adverse to Commission, Mr. Dixon.

Publicity and the railway problem, Mr. Cooley.

Pooling question, Mr. Loeb.

It is somewhat difficult to make provision for the varying needs of students who desire to do advanced work in Political Economy. There are five sets of students whose needs must be considered, as follows: Candidates for the doctorate, candidates for the master's degree enrolled in the Literary Department, candidates for the master's degree enrolled in the Law Department, candidates for the degree of master of laws doing work in the Literary Department, and undergraduates specializing in Political Economy during their senior year. But the experience of the past year shows that the needs of all these may be met by developing the plan of "extra hours" with special students who are in attendance upon the intermediate courses. It is believed that this will prove to be a solution of the problem of developing graduate work in connection with undergraduate instruction. It is intended that, during the next year, Professor Adams will supervise the studies of candidates for the doctor's degree, that Professor Taylor will have special charge of candidates for the master's degree, and that Mr. Cooley and Mr. Dixon will give special attention to undergraduates who desire to specialize in the department.

IX.

INTERNATIONAL LAW.

Lectures are given twice a week during the first semester on the elements of Public International Law, and twice a week during the second semester on the History of European treaties or of American treaties. The subjects are considered from an academic point of view. To the more advanced students, special subjects of investigation are assigned, and suggestions are furnished to guide their reading.

X.

MATHEMATICS.

The remarkable progress of mathematical science during the last fifty years does not seem to be sufficiently recognized and appreciated, even by men of culture and learning. And yet, this progress must be reckoned as one of the prominent features in the general advance of civilization, and as an active factor in the intellectual life of the day. While the various branches of mathematics are developing with astonishing rapidity, while new avenues of research are continually opening, there is evident a strong tendency toward a wider diffusion of the more elementary parts of higher mathematics, and toward a closer contact between the science and the life of the people at large. The fact that in this University more than three hundred students are pursuing the study of Analytic Geometry, and that more than one hundred are taking a thorough course in the Infinitesimal Calculus, cannot be without influence on the general standard of education. The number of men and women intending to devote themselves entirely to the science of mathematics is steadily growing; at the same time there is a much larger number pursuing mathematics as a collateral study, with a view to teaching only the elements of the subject, or as a help in studying Physics, or as a preparation for technical studies and engineering.

A thorough knowledge of Algebra, Plane, Solid, and Spherical Geometry, Plane Trigonometry, is a prerequisite for taking up any branch of mathematics in college or university. The foundation of further study must be laid by a course in Analytic Geometry and in the Differential and Integral Calculus.

The course in Analytic Geometry should at least [illegible] first to [illegible] easily the [illegible] [illegible] Geometry should, at least, include the conic sections and the general equation of

the second degree. The University classes regularly take the first nine chapters of Charles Smith's Conic Sections (Macmillan). In the Calculus the University work is based upon the text-books of Williamson and Todhunter, and requires either four or five hours per week throughout the year. A good course in Descriptive Geometry, or one in Projective Geometry, will be found very helpful.

With this preparation, the student of applied science is ready for the study of theoretical Mechanics and the more elementary branches of mathematical Physics, while the lover of pure mathematics may properly begin his graduate work.

One who wishes to broaden his knowledge of the fundamental subjects, Algebra, Analytic Geometry, Calculus, may well take one of the reading courses. In these courses such books as Burnside and Panton's Theory of Equations, Frost's Solid Geometry, Price's Infinitesimal Calculus, vols. I. and II., Jordan's Cours d' analyses have been read.

The student who desires to become acquainted with the modern developments of the science, will, perhaps, do best to elect at once the courses in Modern Geometry, in Differential Equations, and in the Theory of Complex Numbers. The first of these courses is devoted to the treatment of the modern methods in Geometry, founded by Poncelet, Steiner, Chasles, Plücker, and other mathematicians of the past seventy-five years. Considerable time is given to an examination of the theory of anharmonic ratios and of coördinate systems generally. The idea of projectivity, or of one-to-one correspondence, then becomes the guiding principle, and the general theory of linear transformation is developed for the range and pencil and for the plane. The general methods obtained are then applied to the conic sections, and to some extent to the higher plane curves, and the theory of properties invariant by projection is treated as far as time permits. The course in Differential equations is based upon Forsyth's Treatise, with references to Boole, Johnson, Mansion, Forsyth's Theory, and the original memoirs. During the year the whole book is gone over very carefully, and an unusual amount of attention given to the solution of problems.

The complex or imaginary numbers have now become one of the most indispensable instruments of mathematical research. There is no branch of pure mathematics which is not systematized and invested with new and greater interest by their introduction. The course in this study covers the subject of the common functions of analysis, and leads to the theory of the elliptic and Abelian integrals and functions. The employment of the Riemann's surfaces gives the advantage of a geometric presentation which assists very materially toward a clear conception of the subject. The aim is constantly kept in view of showing the connection of the theory of functions with the correlative theories.

Beyond these fundamental courses, which ought to be taken by every one wishing to make mathematics a specialty, there is a wide field from which to select. [illegible] course in supervision especially [illegible] every year, the choice of subjects depending upon the demand by students and the time at the disposal of instructors. A course in Quaternions is usually given in the second semester. A course in the Theory of Groups of Substitutions will be given whenever called for by competent students.

The courses in advanced Mechanics are devoted to the dynamics of rigid bodies, the more advanced parts of Statics, the theory of the Potential and its applications, Hydrodynamics, and the theory of electricity, the subjects varying somewhat in different years. Williamson and Tarleton's Dynamics (Appleton) and Minchin's Statics, vol. II. (Macmillan) are used partly as text-books and for problems. The text is supplemented by lectures and references to other works.

XI.

ENGLISH AND RHETORIC.

The advanced work of this department proceeds along three lines:

1. *History and Philology of the English Language.* Courses extending through the year are offered in phonology, morphology, and syntax of Old English (Anglo-Saxon); also courses in Historical English Grammar, and in the spoken English of to-day. To these are added an advanced course in Old English Poetry. A knowledge of the elements of Anglo-Saxon is requisite for entering upon these studies.

2. *Higher Rhetoric and Elocution.* (a) A course in the application of the principles of style to masterpieces of prose is accompanied by a course in the classics of criticism and literary theory. The courses in Rhetoric required for the bachelor's degrees must precede these courses. (b) A study of great orators, ancient and modern, is also provided for, the aim being to discover and illustrate methods of public address and the sources of power. A course in Oral Discussions is designed to develop readiness of extemporization. It involves the practical application of the principles of formal Logic and of Elocution in the discussion of leading topics of the day. Students are required to present briefs of the subjects discussed, and to set forth their arguments in speeches as clear and forcible as possible. The courses in Elocution preparatory to this work run through an entire year.

3. *Literature.* In the seminary courses opportunity is offered, through reading and discussion, for original research bearing upon (1) the nature and meaning of the great movements in the history of literature; (2) the influence exercised upon English and American writers by the literature of other nations; and (3) the interpretation of works of literary art in the light of established critical principles. Courses are offered in English Masterpieces and Shakespeare, running through one year. Facilities for the study of American Literature are offered, extending over a like period. A course of lectures on Dramatic Art and History accompanies the work in Shakespeare.

The courses above outlined are also open to undergraduates who are prepared to take them, but will usually be found suitable for candidates for the master's degrees also. In case of persons who have taken these courses for their first degree, special advanced work

will be assigned after conference with the candidate. Candidates for the doctorate will receive individual attention and assignment of work, according to their aims and needs.

The courses in this department affiliate with almost every line of work—ancient and modern languages and literatures, history, philosophy, pedagogy, political and social science, mathematics, and general science.

XII.

PHYSICS AND ELECTRICAL ENGINEERING.

Before entering upon the work counting for a second degree, graduate students must have taken the equivalent of four courses of undergraduate work, which usually extend over two years, but which may be completed in a year and a half if more courses than one are taken at once. These are courses 1, 2, 3, and 4. The first two take the student over the entire range of Physics, with some mathematical treatment involving Algebra and Trigonometry but not Calculus; the last two form an introduction to the laboratory work in Sound, Light, Electricity, Magnetism, and Heat. A knowledge of the elements of Calculus will be found useful even in these first laboratory courses. Graduate students who lack this preparation may pursue the above courses in the laboratory, but with the understanding that such work does not count either as a major or a minor study.

Graduate students may specialize either in Light or Electricity, and an advanced course in Heat will be added either in 1893-4 or 1894-5, as required.

The work in Light involves laboratory work in connection with two hours a week in Preston's "Theory of Light." For the laboratory work the best appliances are provided, including an optical bench and three spectrometers. It is concerned with the measurement of focal lengths, indices of refraction for definite wave-lengths, diffraction phenomena, wave-lengths of light by means of transparent and reflecting gratings, and the constants involved in polarized light.

In Electricity the student begins with a course of lectures on electrical units and the most approved methods of electrical measurements. These methods are applied in three periods of laboratory work a week. Only the best modern instruments, of both American and foreign make, are in use in the laboratory.

A second laboratory course takes up the more advanced and difficult methods of measurement, requiring greater skill and more attention to minute details. The student is referred to various sources of information respecting methods, and is required to write up his work quite fully from such sources. The work includes the most exact comparison of resistances by the Carey Foster method, determination of specific resistance and of temperature coefficients; the comparison of the electromotive-forces of standard cells and the measurment of their temperature coefficients; the determination of the electromotive force of a standard cell by means of the silver voltameter; the magnetizing curves of various kinds of iron and steel, as well as their hysteresis curves; and the most exact calibration of the instruments used in these measurements.

The course in dynamo-electric machinery includes lectures and laboratory work, the latter involving characteristic curves of dynamos, their efficiency, the efficiency of motors and transformers, and such other problems as usually belong to a course in this subject. The more advanced work in the theory of electricity comprises a study of the alternate current transformer (Fleming, Vol. I.) and both volumes of Mascart and Joubert's Treatise on Electricity and Magnetism. Hereafter a single semester will be devoted to the "Mathematical Theory of Electricity and Magnetism" by Emptage, as an introduction to Mascart and Joubert. Opportunity is also afforded for practical work in advanced photometric measurements.

The physical laboratory now possesses facilities for research work, particularly in the direction of electricity and magnetism; and graduate students are urged to avail themselves of the opportunity offered.

XIII.

GENERAL CHEMISTRY.

Students taking up graduate work in this department must have completed enough work in elementary General Chemistry, Analytical Chemistry (both qualitative and quantitative), Organic Chemistry, and organic preparations to enable them successfully, to carry on more complicated manipulations without loss of time in going over simple preliminary operations; they are furnished chemicals and apparatus from the private laboratory, and have places assigned them in that room. All candidates for either a master's or doctor's degree must have a reading knowledge of German and French. The work for the master's degree, with General Chemistry for a major subject, has heretofore been investigation, in each individual case, of some one chapter belonging to a comprehensive research undertaken by the entire working force of the private laboratory; each student being expected to study the literature of the whole subject under discussion. The work for the master's degree is designed more especially to familiarize the student with the technique of laboratory research rather than to start him on an investigation of his own. The professor works in the same laboratory with the students and on the same research, his endeavor being to establish, in advance of the students, the most important new points in the investigation, the details being afterward filled in by his co-workers. Candidates for the doctor's degree are expected to plan and carry out researches in a topic allied to the main subject taken up by the laboratory; the experimental work must be completed and the results must have a permanent theoretical value; they must be familiar with the literature of the most important chemical researches and must be able to use the familiar knowledge in a practical way in the laboratory.

Lecture courses in theoretical Chemistry of recent years and on the rarer chemical elements are offered, and graduate students will be expected to take these, or to have had their equivalent, before enrollment. Laboratory work in the determination of molecular weights is offered in conjunction with the first named of these courses, and is considered to be absolutely

essential to either of the higher degrees. A Journal Club, which is to meet twice a week, will be inaugurated in the second semester of 1893-94, the professor, instructors, assistant, and all graduate students in the department, taking part in this work.

XIV.

ORGANIC CHEMISTRY AND ANALYTICAL CHEMISTRY.

Graduate work in these subjects may be divided, according to its aims, into classes as follow: Class *first*, having Chemistry as a leading study; Class *second*, having Chemistry as a lateral support to a leading study; Class *third*, graduate or undergraduate as judged by the Council, having Chemistry, more or less advanced, to enlarge the entire educational measure beyond the sum denoted by the bachelor's degree in this institution. A graduate who sets out to gain strength as a chemist belongs in class first, whether he seeks a higher degree or not. One who would use chemistry as a distinct means of strength in some other science belongs in class second, and when he enters for a higher degree he writes a chemical minor study. The bachelor who desires only to round out his scholarship by filling a gap, might be classified as a graduate in undergraduate studies belonging in class third.

Graduate chemical work, defined according to its quality, must be characterized by a good degree of independence. The candidate for any branch of it must be able to undertake some trustworthy determinations in the laboratory, and should know how to draw upon the original literature of the subject in the library. It is work not limited by routine. A good deal of the student's time is expended, it is true, in gaining control of routine methods, and some courses of routine study are taken, but these are subordinate to ends of critical study, or of research, upon which the student's mind is constantly fixed. Each application for graduate work is therefore judged upon its individual merits, according to the qualifications of the applicant and the nature of the studies applied for. If the leading study is to be in Chemistry, then research by the student is always the aim and is usually reached, if he remain long enough. Nothing else gives so much strength to the education of the chemist. And any student of sufficient preparation, good industry, and fair ability can do creditable work in a research under direction. In the major study for the master's degree, whether a [illegible]esis be required or not, original work is expected. [illegible]he major for the doctor's degree, it is hardly necessa[illegible] say capacity for independent investigation is requ[illegible]

Th[illegible]

[illegible]cal Che[illegible]ergraduate studies in Organic and Analyti[illegible] the Grad[illegible] not enumerated in the Announcement of [illegible]ing to six[illegible]ool, comprise fifteen courses, amount[illegible] forty-two cre[illegible]edit hours. "From twenty-one to [illegible] if the work be[illegible]s, general, analytical, and organic, [illegible] made to suffice[illegible]ected to the end in view, may be [illegible] prepare him for[illegible]ng to the aims of the student, to [illegible] him to take cours[illegible]nate studies"; that is, enable [illegible] the Graduate Sch[illegible] enumerated in the Announcement of [illegible]ool. Graduates of other colleges who [illegible] course in supervision especially [illegible] have carried laboratory work through two college years are, in many cases, found prepared to take the graduate courses at once. It has rarely occurred, however, that graduates of other colleges, even when they have gone through chemical laboratory courses, have been able to obtain a master's degree in less than two years.

There are no graduate courses in this department, save the extension of the research courses provided for the major study toward the doctor's degree, which are beyond the reach of undergraduates. Besides those working for B. S. in Chemistry, there are students for A. B., Ph. B., B. L., and B. S. in general science, who obtain about half of their total college credits in the chemical courses, and become independent in research both in the laboratory and in the library. In their senior year they must be classified as undergraduate students in graduate chemical studies. Every year some work worthy of publication is obtained from them. As candidates for the several bachelors' degrees they cannot be distinguished from each other by the grade of their work. If the University could offer fellowships to these, there would be a great increase in real graduate work.

Seven graduate courses are given in this department by three members of the faculty, each course extending through the year. Each professor offers a course in research, beside which the subjects are organic synthesis with ultimate analysis, analytical organic chemistry, inorganic reactions and quantitative method. Original work is adapted to each student, keeping within the range of inquiry undertaken in the laboratory. The constitution of the alkaloids, the facts of inorganic oxidation, and the proximate analytical determination of iron and steel, are chief among these subjects. Critical bibliography is classed as research, but it must be accompanied by some laboratory investigation unless the student has had experience in the latter. It must be prepared in literary form for publication.

XV.

ASTRONOMY.

A candidate for the degree of Doctor of Philosophy with Astronomy as a major or minor, before beginning work for the degree, should be prepared in elementary Astronomy, Calculus, Elementary Mechanics and Trigonometry. For a major he should take all the Courses given in Astronomy, and must spend a year on some Astronomical investigation. He should arrange to include in his minors Courses 6 and 11 in Physics, on light, and Courses 9, 15 and 16, in Mathematics, on differential equations and advanced mechanics.

A candidate for the Doctor's degree with Astronomy as a minor should include in his work courses in theoretical astronomy, special astronomy, and the use of instruments.

A candidate for the Master's degree with Astronomy as a major or minor should be prepared in elementary Astronomy, Calculus and Trigonometry.

XVI.

MINERALOGY.

In Mineralogy no organized course is announced but Professor Pettee will direct the work of candidates

for higher degrees, Mineralogy as a major or a minor study, along such lines as may be agreed upon. An elementary knowledge of descriptive and determinative Mineralogy is presupposed.

XVII.

GEOLOGY.

The course of instruction in Geology for undergraduates, as announced in The University Calendar for 1892-'93, page 83, embraces two years. The first year is devoted to elementary studies in Physical Geology, and Historical Geology, giving three hours a week to each for one semester. LeConte's Elements of Geology is used, supplemented by lectures and exhibitions of specimens, maps, etc. During the second year more detailed instruction is given, two hours each week in the same general subjects. Green's Physical Geology is used for reference during the first semester, supplemented by lectures and laboratory work. Each student is given a special subject for investigatiou, in connection with which a thesis of about 2500 words is required. During the second semester paleontological studies are carried on with the aid of various treatises and laboratory work. A special subject is assigned each student and a short thesis is required.

Students in the graduate school may enter either of the advanced courses mentioned above, provided studies equivalent to the elementary course have been pursued. Those who have done more work than is represented by the elementary course, may make special arrangements for instruction and assistance in various lines of study dependent on their tastes and acquirements. In a general course the current literature of Geology will be read with special reference to Pleistocene geology and to the origin and classification of topographic forms, glacial records, lake histories, erosion and all of the processes by which the surface of the earth has come to have its present form.

The geological museum is being re-arranged, and a series of fossils selected to illustrate the life history of North America. This collection is intended expressly for the use of students in the elementary courses, but may be consulted by advanced students as well. The specimens will be exhibited in the lecture room as required, and after lecture will be returned to the cases in the museum where they will be available for examination at any time.

There is a second collection embracing some ten thousand specimens of both American and European fossils, which is arranged zoölogically and intended for the use of advanced students in a Paleontology. Special collections of rocks, brachiopods, corals, etc., numbering from 150 to 200 specimens each are arranged in the geological laboratory for the immediate use of students.

The collection in Physical Geology is small, but efforts are being made for its enlargement, and it is expected that by the opening of the collegiate year in October, 1893, ample material will be on hand to illustrate lectures in this department. Students bringing private collections will be given an opportunity to arrange them [illegible] first to [illegible] the [illegible] [illegible] in cases provided for the purpose, and facilities for consulting original monographs, and making comparison with specimens in the museum.

The geological laboratory is provided with apparatus for preparing thin sections of fossils and rocks, and with microscopic and photographic instruments. The laboratory is open to students from nine until five each day throughout the collegiate year.

XVIII.

ANIMAL MORPHOLOGY.

The laboratory and equipment are described in The University Calendar. The expenditure of a sum set aside by the Regents for this purpose will considerably increase the equipment for the next year. The laboratory library contains sets of important French, German, and English periodicals, as well as many separate publications. The private collections of the instructors in Morphology, and the library of the Medical Department, which is rich in the literature of vertebrates, are also accessible.

All courses in Animal Morphology must be preceded by a year's work in General Biology, carried on conjointly by the departments of Botany and Animal Morphology. Graduate students who have had equivalent courses elsewhere may omit this work, but experience has shown that the course is often of value to such students. The lectures on Invertebrate Morphology treat of Comparative Anatomy and Ontogeny. The laboratory work embraces a series of forms which supplements that given in General Biology. Students are required to prepare and deliver lectures on assigned topics. The lectures in Vertebrate Comparative Anatomy are illustrated by charts and preparations made for the purpose. In Comparative Anatomy, a few type-forms are dissected, while preparations of many other forms are studied. The laboratory work in Embryology begins with the study of fishes and amphibia, and concludes with detailed work on the chick and rabbit. There are also courses in Mammalian Anatomy and Histology, which provide for the academic student a training equivalent to that received by the medical student.

The Field Club work is designed primarily for graduate students. It consists of a study of the invertebrate fauna of the neighboring waters, and illustrates the application of morphological principles to classification. Excursions are made and the forms collected are determined by the use of the original literature, a very large part of which is accessible. The instructors and advanced students have formed a Journal Club, which holds weekly meetings at which reports are made on important current papers, followed by informal discussions. The meetings are open to all. In research work, definite problems are worked out under the continuous supervision of the instructors, and productions of sufficient importance are published. The locality affords exceptional advantages for research work on Vertebrate Embryology (Petromyzon, many Teleosts, Amia, Acipenser, Amblystoma, and others being under control), and for faunal or experimental studies on invertebrates. Students intending to begin research work should confer with the professor in charge as early as the preceding

spring, in order that they may have the summer in which to prepare necessary material.

All work for the higher degrees presupposes a year's work in General Biology, or its equivalent, a knowledge of the elements of Physics and Chemistry, and some acquaintance with French and German. Candidates will usually pursue both Vertebrate and Invertebrate Morphology, but will find it of advantage to specialize in one of them. They are expected to take part in the work of the Journal Club. A candidate for the master's degree who selects Animal Morphology as a minor, may pursue courses in either Invetebrate Morphology, Vertebrate Comparative Anatomy, Vertebrate Embryology, or Histology, but should not attempt to do work in more than one of these subjects. If Animal Morphology be chosen as a major, work may be taken in Invertebrate Morphology, and at the same time in any two of the branches of Vertebrate Morphology named above. For any one of these branches, the student may substitute the preparation of a thesis, and such substitution is advised for those who do not intend to become candidates for the doctor's degree. The work outlined for those who elect Animal Morphology as a major for the master's degree is suitable for candidates for the doctor's degree who elect this subject as a minor. Those electing Animal Morphology as a major for the doctor's degree are expected to complete all the courses offered in this subject. During the first part of his term of residence at the University, the candidate should devote his time to these courses and to the completion of the minors. To graduates who have taken these courses or their equivalents will be assigned a corresponding amount of work in reading and in the preparation of theses. In his second year of residence, in addition to completing the work mentioned, the student is expected to repeat a designated piece of research work, in order to acquaint himself with methods of investigation. At the same time he does assigned reading on the more important problems of Morphology and on zoölogical history and theory. At least one year must be devoted to the researches which are to be embodied in the doctor's dissertation.

Candidates for the higher degrees who elect Animal Morphology as a major will find it of advantage to select as one minor either Botany, Physiology, Systematic Zoölogy, Paleontology, or Physiological Psychology. Less closely related is work in Bacteriology, Physiological Chemistry, and Geology.

XIX.

PHYSIOLOGY.

The advanced work in physiology presupposes a knowledge of Mammalian Anatomy, including Histology, and the elements of Physics and Chemistry. The required training is to be derived from courses in Animal Morphology, Physics, General Chemistry and Organic Chemistry, together with courses in Descriptive Human Anatomy, Practical Anatomy, and Vertebrate Histology. Ability to read German is indispensable, and French desirable, for students taking Physiology as major study for an advanced degree, though in some cases a candidate may be considered qualified to begin his work prior to the completion of the linguistic requirement. The courses are: Lectures and recitations, five hours a week, throughout the year; Laboratory course three times a week, one-third of a year; Physiological Experimentation, one hour a week, one semester. Physiological research and collateral reading are arranged to meet the wants of students who take Physiology as a major study.

XX.

BOTANY.

Two full courses each semester will be offered to graduate students. The courses in Plant-Histology and Physiology will be conducted by Assistant Professor Newcombe, and in Cryptogamic Botany by Mr. Johnson. Detailed descriptions of these cannot now be published. Professor Spalding, who has leave of absence for the coming year, will, on his return, offer special courses to be designated and described hereafter.

THE UNIVERSITY EXHIBITS AT CHICAGO.

The Exhibits of the University at the World's Columbian Exposition are found in two places; the Educational Exhibit in the Department of Liberal Arts in the Manufactures Building, and the Museum Exhibit of Michigan Animals in the Michigan Building. The University was especially favored in receiving 2,700 square feet of floor space, which, with the exception of Harvard University, was the largest award to any college in the Liberal Arts Department. This space lies on either side of a main aisle in Section K, in the gallery in the southeast corner of the building, and is flanked by the Massachusetts Institute of Technology and Yale University, with Johns Hopkins University near by across the aisle.

Owing to the uncertainty of adequate financial support and the fact that space was not assigned until the latter part of December last, the committee having the matter in charge was unable to begin the preparation of the educational exhibit until about January 1. Numerous delays were encountered, and naturally the exhibits lack the completeness that more time would have insured; notwithstanding which, however, the University was early on the ground, and the exhibits may be said to be creditable and dignified, even if somewhat plain and unpretending in their mountings.

The general plan of the educational exhibit includes topographical maps of the campus, made from actual surveys by civil engineering students, on which all buildings and natural objects

are accurately located. A tolerably complete set of views of all buildings, with floor plans of many of them, together with interior views of all laboratories, hospitals, many recitation rooms, and the library, present to the visitor a somewhat comprehensive idea of the University as a whole. A condensed account of the educational system of Michigan, and a summary of The University Calendar, together with photographs of the President, Regents, and other officers, including members of the several faculties, are mounted and displayed on a revolving chart-stand. A brief history of the University and of its several departments, together with a summary description of their present condition, is exhibited by a series of nineteen charts, twenty-four by thirty inches in size, framed and mounted so as to swing about a central upright. A bookcase contains copies of nearly all the publications of professors written while connected with the University.

The remainder of the exhibit is departmental in character, and is sufficiently explained below.

1.—CHEMISTRY.

The chemical exhibits are designed both to represent the composition of matter and to illustrate methods of chemical teaching. As object lessons of the composition of matter, the constituents of certain well-known articles are set forth in quantitative exhibits. Among the articles laid open in this way are the chief industrial metals, a few common foods, and a larger number of medicinal plants. The illustrations of the means of chemical instruction are limited to a few of the more distinctive methods of this institution, both in lecture-room and in laboratory.

The quantitative exhibits have been prepared by our own students, and represent our means of instruction, as well as the chemical work of our laboratories, but as they are of much direct interest to the public at large, irrespective of their relation to college work, they are classed separately from the other educational appliances. They represent university extension in a true sense. Newly made in laboratories of science, they give vivid instruction to the public at large.

The quantitative display of the composition of metals in use and of related materials has been prepared by students under the direction of Prof. E. D. Campbell, as a part of his advanced laboratory work, and fills ninety feet of shelving in a case by itself, under the inscription "Metallurgical Chemistry." The quantitative analyses of twelve articles are shown, with from six to ten constituents of each article, all mounted in Dœrflinger glass jars, which are seventeen inches high, and usually three inches wide, with suspension hooks under their wide-mouthed stoppers. The article itself is presented in an amount of from 800 to 3200 [illegible] grams, and each constitutent is made conspicuous in a separate jar, the smaller quantities being set forth in thin glass cylinders suspended in the center of the jars. The constituents have been made mostly by the students as analytical preparations. In this way the following named articles are opened out: Three ores of iron—each showing the silica, alumina, iron as oxide, iron as metal, manganese oxide, lime, magnesia, phosphoric anhydride, sulphur, and moisture; two varieties of cast-iron, showing graphite, combined carbon, silicon, sulphur, phosphorus, and manganese; blast furnace slag and its eight constituents; two grades of steel, and one of wrought-iron, with six constituents; coal with six constituents, and limestone with seven; brass with four constituents. Under the chemistry of foods, are shown eight quantitative sets, for wheat, bread, Indian corn, tea, coffee, and three other caffein-bearing plants; wheat grain and wheat bread, each with its prepared components, starch, gluten, oil, fiber, ash, and water; corn with its starch, its three proteids, its oil, fiber, ash, and water. The constituents, other than water, were prepared from their proper sources, while the quantity of each was taken from the averages of König. The analysis of medicines and condiments is represented by eight sets of components. Under the head of Pharmacognosy, there are about one hundred selected specimens of medicinal plants mounted in groups, including seven well-represented families, with some fine drawings of structure, and with pressed plants as well. Fine microscopical drawings of cloves and coffee, and about forty micro-photographs by Prof. Stevens, are brought into place in this part of the exhibit. The class studies in Pharmacognosy are illustrated by a collection of teaching specimens in glass boxes, and by another collection of quiz specimens in little jars. There are selected pieces of pharmaceutical apparatus put up with the products of their use; also a complete set of the pharmacopœial salts, made by students, and another of the bright colored berberine compounds.

Studies of organic chemical structure, in the class-work of the University, are illustrated by a set of molecular models, put up to show diagrams of three dimensions, in comparison with diagrams of two dimensions, showing that the latter are insufficient to represent geometric isomerism. In the same low-set case is displayed a collection of over twenty chemical bibliographies, mostly in manuscript, with some published ones, compiled by students. Over half of these are brief bibliographies in Metallurgical Chemistry, made this year by the students of Prof. Campbell. In setting forth methods of conducting laboratory work, a full set of the "unknowns" of Prof. Johnson is displayed, with the report of contents in chemical symbols.

2. MEDICINE AND SURGERY.

This occupies a screen 34 feet long by 10 feet high, at the eastern end of the space allotted to the University. The exhibit consists of thirteen large and sixty-one small photographs of buildings, laboratories, and apparatus, together with printed cards descriptive of the work done in the school as a whole and in its separate departments. In addition to these there are three

large frames containing a series of photographs of pathological preparations, and a number of specimens of electrical apparatus made by students in the course in Electro-Therapeutics. The photographs and cards are so arranged as to form an illustrated catalogue of the Medical School. In the center of the frieze above the photographs is a large sign in blue and gold, "Plan of Instruction in Medicine." Directly below this in the middle of the screen is a card giving a general outline of the work of the department, and around this are grouped photographs of the buildings in which the work of the department is done. To the left are photographs relating to the scientific studies of the first and second years, comprising: Anatomy, Chemistry, Physics, Hygiene, Bacteriology, Histology, Physiology, and Electro-Therapeutics. To the right, in a corresponding position, are photographs illustrative of the more practical studies of the third and fourth years, viz: Internal Medicine, Materia Medica and Therapeutics, Surgery, Obstetrics and Gynæcology, Diseases of the Nervous System, Opthalmology and Laryngology, Dermatology, and Pathology.

Each of the departments is represented by a series of photographs, and by a printed description of the work done. To the extreme left of the screen are similar photographs and cards illustrating the work done in Biology, and beneath this is a statement of the courses in the Literary Department preparatory to the study of medicine, and the so-called six-and-a-half-years-medical course.

3. DENTAL SURGERY.

The exhibit of the College of Dental Surgery contains photographs of the building and the different rooms, showing students at work in the laboratories and clinical rooms, also a floor plan of the building, and large photograph of the faculty and present class. To illustrate the course of study, samples of every appliance made in the laboratories by the Freshman and Junior students, and statistics of the operations performed in the clinics by the Senior students are given. Time and lecture schedules showing the number of hours devoted to didactic teaching, announcements describing the course, and forms illustrating the executive and business details complete the exhibit.

4. THE ENGINEERING EXHIBIT.

This exhibit, which occupies a space 20 feet by 52 feet 6 inches, on one side of the main aisle, represents the work done in the Engineering Laboratory and in the several courses in drawing and engineering design. A case of forgings on the wall illustrates the course in forging, which covers one semester's work, or about 80 hours time, and shows the progress made by the student from day to day. A forge designed and built in the laboratory shops by students, and a duplicate of those in use, stands under this case. The machine-shop exhibit adjoins the forge exhibit, and contains samples of small tools displayed in glass cases; an overhead drill-press, or vertical boring mill, having a range up to eight inches in diameter, and an engine lathe of 16-inch swing and 6 foot bed, built of castings given by the Putnam Machine Co., Fitchburg, Mass. These tools were built by students, and represent one semester's work, or about 180 hours time.

The course in wood and pattern work occupies benches beyond and to the right of the tool cases. This part of the exhibit is arranged to show the progress made by the student. The patterns were selected from those in actual use in the foundry, and represent the skill acquired in one semester's work, or about 180 hours time. A bench fitted up with tools is a duplicate of those in the laboratory, and illustrates the facilities afforded the student for work. A large model of a roof-truss is erected over the middle entrance to the exhibit, and illustrates the carpenter work done by civil engineers.

The foundry exhibit comprises sets of castings shown in the unfinished state, and also finished ones in the machines, displayed in the machine-shop exhibit. This represents one semester's work, or about 120 hours time.

A large number of blue-print drawings show the actual work of students in the design of shop-machinery and in general machine design. These are displayed on the surrounding wall-space, and on specially constructed screens, and, together with the drawings illustrating civil engineering design and the several courses in drawing described further on, make up a very complete representation of the draughting work.

The field practice of the civil engineering section is shown by a large map, on which is laid down the work accomplished by the class of last year at Leland, in U. S. land surveying, in railroad surveying and staking-out, contouring, triangulation, hydrography, etc. The work of preceding classes is represented in another color, covering other parts of the same territory.

The finished drawings in structural designing of roof-trusses and bridges show the application of the principles of strength and resistance of materials and the theory of construction to actual cases.

No special preparation was made for the exhibit of drawings, with the exception of the necessary maps of the campus; otherwise the drawings are simply examples of the regular class-room work of students. The exhibit consists of a large number of examples of the first year's work in Geometrical Drawing, illustrating the student's dexterity in the critical use of instruments in the graphical solution of geometrical problems, and in the use of brush and color in shading and tinting. The work in Descriptive Geometry is well represented by numerous complete sets of plates, showing solutions of original problems involving principles from the point and line up to and including warped surfaces.

In free-hand drawing the exhibit consists of pen-and-ink sketches, both in projection and in perspective of geometrical forms, from models illustrating plane-sided volumes, volumes bounded by single-curved and double-curved surfaces, and irregular forms, parts and pieces of machinery, with the natural shades and shadows. The samples of work in mathematical perspective, shades and shadows, and oblique projections are all of original problems, as are those in Stereotomy. Examples are given of the determination of the curves of shade on single and double-curved surfaces, and on

warped surfaces, the oblique perspective of some complex forms, with shadows completely determined.

In Stereotomy some of the more complex problems are fully shown by tinted and shaded plates, among them the stone-spiral stairway, with spiral arch overhead; also examples of the solution of the helicoidal arch, various forms of the wing-wall, as well as other problems. The plates in Machine Drawing, all of original problems, worked out by students, show the work done in the study of screws, cams, and gearing. The method of determining the forms of gears is pretty fully illustrated, and a plate showing a comparative study of the theoretical curve, with the most approved practical solutions, is given; also examples of outside and inside bevel-gear, screw-gear, and helicoidal and "herring-bone" gear. The plates are "dimensioned," tinted, and properly shaded and hatched, with the student's name on each. In connection with these various sets of plates, a title-page for each set is given. Topographical drawing is well illustrated in connection with the maps of the campus, and of the various surveys.

5. THE LIBRARY.

The exhibit of books and pamphlets written by the professors and instructors of the University consists of 214 volumes and 125 pamphlets. An effort, which was fairly successful, was made to procure as many as possible of the works of the men who are no longer living. Brünnow is represented by 2 vols.; Cocker by 4 vols.; Campbell by 1 vol.; Fasquelle by 7 vols.; Frieze by 4 vols.; Pres. Haven by 2 vols.; Elisha Jones by 3 vols.; Morris by 7 vols.; Olney by 15 vols.; Palmer by 5 vols.; Pres. Tappan by 6 vols.; Watson by 3 vols., and Winchell by 8 vols. The fugitive pieces of Dr. Winchell were collected by his brother, Prof. N. H. Winchell, of Minnesota, and bound in 5 vols. These he presented to the University library, but they arrived too late for the exhibit. Dr. Asa Gray is represented in the collection by Torey and Gray's *Flora of North America*. This work was published while Dr. Gray held the chair of Botany in the University. The work of the living professors and ex-professors is also fairly well represented.

6. THE MUSEUM.

(I).

A group of *Tamarou (Anoa) Mindorensis*, bull, cow, and calf, killed in June, 1888, in Mindoro, Philippine Islands. This little water buffalo appears to be confined to the island of Mindoro, in the interior of which it is abundant. The finest authentic specimens of this species were procured by the Steere Expedition to the Philippines, at the date above given.

(II).

A large map of the Philippines, with fifty species of birds of nine genera arranged upon it. The object of this map is to show a peculiar law of distribution of the genera and species of resident land birds, in the Philippines. This law may be stated as follows: *Genera are represented by but a single species each in a place.* Or in general terms, *No two closely allied species are found in the same place.*

(III).

Two cases of corals from the Philippines and Formosa. These contain 450 specimens and about 300 species, many of them apparently new and undescribed. This probably is the most complete collection of corals ever made from this region. It establishes the hitherto unknown *habitat* of many well-known species.

(IV).

In addition to the above mentioned Zoölogical Exhibit from the University, a collection of the birds and mammals of Michigan will be found in the Michigan State Building. This comprises thirty-nine specimens of mammals, and four hundred and sixty-four of birds. The smaller mammals and birds fill a case 38 by 13 feet in size. The larger mammals are not enclosed in a case, but occupy a floor space of 20 by 20 feet surrounded by a railing. At the request of the State Board especial attention was paid to the game birds and mammals of the State, and these are shown, when possible, in groups. As far as possible all the mammals have been mounted in characteristic attitudes. Several large mammals are shown which are known to have lately existed in the State, but which are now extinct or nearly so. Among these are the elk, moose, and caribou. A large part of this collection was purchased and mounted especially for this exhibit, and when returned to the University will make a valuable addition to the collection in the museum.

The exhibits are in charge of Mr. Eben B. Gower, a student in the University, who will be found at the Educational Exhibit, Section K, Liberal Arts Department. A record-book will also be found there, in which all graduate and non-graduate students visiting the Exposition are requested to register.

A CLASSIFIED BIBLIOGRAPHY ILLUSTRATING A COURSE OF LECTURES ON METHODS OF STUDYING AND TEACHING HISTORY, WITH PARTICULAR REFERENCE TO THE HISTORY OF THE UNITED STATES.

While the English language is very rich in historical literature, it is comparatively poor in works relating to the Study and Teaching of History. For example, of the sixty-eight numbered titles found in Dr. Hall's "Bibliography of Education" under the head of "History and Political Science," only some twenty are in English, while a majority of these are either manuals, guides, or articles prepared for the periodical press. In fact, most of the pedagogical literature relating to the subject must be sought in magazines, educational journals, pamphlets, and proceedings of educational associations. Upon the whole, it must be said that the professional literature relating to the subject is now rapidly increasing. In this bibliography it is deemed wise to name first a few works to which all High School teachers of History, at least, should have constant access.

I. ADAMS, C. K.—A Manual of Historical Literature. Comprising Brief Descriptions of the Most Important Histories, in English, French, and Ger-

[illegible] man, together with Practical Suggestions as to

Methods and Courses of Historical Study for the use of Students, General Readers, and Collectors of Books. Omitting the sub-heads, the chapters are entitled: Introduction, On the Study of History, Universal Histories, Histories of Antiquity, Histories of Greece, of Rome, of the Middle Ages, of Modern Times, of Italy, of Germany, of France, of Russia and Poland, of the Smaller Nationalities of Europe, of England, and of the United States. This work is the most valuable of its kind that American scholarship has produced.

II. HALL.—Methods of Teaching History. The first edition of this work contained Dr. Diesterweg's valuable treatise, Instruction in History, but it has been excluded from the revised edition, and is now published separately. The contents of the book are the following: Introduction, Methods of Teaching American History, Practical Methods in Higher Historical Instruction, On Methods of Teaching Political Economy, Historical Instruction in the Course of History and Political Science at Cornell University, Advice to an Inexperienced Teacher, A Plea for Archæological Instruction, The Use of a Public Library in the Study of History, Special Methods of Historical Study, The Philosophy of the State and of History, The Course of Study in History, Roman Law, and Political Economy at Harvard University, The Teaching of History, On Methods of Teaching History, On Methods of Historical Study and Research in Columbia University, Physical Geography and History, Why do Children Dislike History? Gradation and Topical Method of Historical Study, Part I.—Historical Literature and Authorities, Part II.—Books for Collateral Reading, Part III.—School Text-Books, Supplement, History Topics, Bibliography of Church History. These chapters are the work of distinguished specialists, and the book is one of great value for the student and teacher.

III. ADAMS, H. B.—The Study of History in American Colleges and Universities. A Circular of Information of the Bureau of Education. Dr. Adams aims to exhibit the origin, development, and present status of History in the Colleges and Universities of the United States. The institutions treated at greatest length are Harvard, Yale, Cornell, and Johns Hopkins Universities, the University of Michigan, and Columbia College, though some others are included. A chapter is devoted to history and political science in the Washington High School.

IV. FREEMAN, DR. E. A.—Few historical writers can be studied by advanced students and teachers with more advantage than Dr. Freeman. This is due in part to the diversity of his subjects, to the thoroughness of his treatment, and to the variety of forms into which he has thrown his studies, but largely to his method and style, [illegible] which is always strong and clear, with plenty, [illegible] and sometimes an excess, of emphasis on the main points. Viewing his works from a pedagogical standpoint, the following titles may be given: (1) The Historical Geography of Europe, 2 Vols. Vol. I., Text; Vol. II., Maps. Introduction, The Geographical Aspect of Europe, The Effects of Geography on History, and The Geographical Distribution of Races. The chapters bear the following titles: Greece and the Greek Colonies, Formation of the Roman Empire, The Dismemberment of the Empire, The Final Division of the Empire, The Beginning of the Modern European States, The Ecclesiastical Geography of Western Europe, The Imperial Kingdoms, The Kingdom of France, The Eastern Empire, The Baltic Land, The Spanish Peninsula and its Colonies, and The British Islands and Colonies. The volume of maps is not properly an historical atlas, but is intended to show boundaries of states and changes of political geography. (2) Methods of Historical Study. Eight Lectures Read in the University of Oxford, with an Inaugural Address entitled, The Office of the Historical Professor. The subjects of the other lectures are: History and its Kindred Studies, The Difficulties of Historical Study, The Nature of Historical Evidence, Original Authorities, Classical and Mediæval Writers, Subordinate Authorities, Modern Writers, and Geography and Travel. (3) Comparative Politics. Six Lectures Read before the Royal Institution. (4) The Unity of History, the Rede Lecture before the University of Cambridge. (5) The Chief Periods of European History. (In numbers 4 and 5 Dr. Freeman has developed his favorite ideas of historical unity and continuity). (6) The Growth of the English Constitution. (7) Good examples of the author's method, as well as good historical work, may be found in the following Essays: The Relations between the Crowns of England and Scotland, The Franks and the Gauls, The Continuity of English History, The Holy Roman Empire, First Series; Race and Language, The Byzantine Empire, Third Series; Historical Cycles and Augustan Ages, The Growth of Commonwealths, The Constitution of the German Empire, and The House of Lords, Fourth Series. Freeman's General Sketch of History is one of the best. In his essay on Lord Macaulay, Dr. Freeman remarks: "It is for others to judge whether I have learned from Macaulay the art of being clear; I at least learned from Macaulay the duty of trying to be clear." He says he learned of him that to be clear a writer must (1) "avoid involved, complicated, parenthetical sentences;" (2) "avoid sentences crowded with relatives and participles;" (3) and, upon this he lays great stress, "never to be afraid of using the same word over and [illegible] over again, if by that means anything could

be added to clearness or force." He very justly remarks that Macaulay "never goes on, like some writers, talking about the 'former' and the 'latter,' 'he,' 'she,' 'it,' and 'they,' through clause after clause, while his reader has to look back to see which of several persons it is that is so referred to." He might have added, with equal truth, that Macaulay, never, like Gibbon, writes history allusively, assuming that the reader has the facts already in his possession, and that it is the author's business merely to discourse or comment upon them; but that, on the other hand, Macaulay always looks his facts squarely in the face, and proceeds to state them in a straightforward manner, a virtue that is also exemplified by Dr. Freeman himself.

[Appreciative estimates of Freeman: Bryce, English Historical Review, VII., 497; John Fiske, The Atlantic Monthly, January, 1893, 99].

V. Stubbs.—The Study of Mediæval and Modern History. Seventeen Lectures Delivered in the University of Oxford. Everything that Bishop Stubbs has written, apart from its historical value, has pedagogic merit. The following lectures may be particularized: I. Inaugural; II.-III. On the Present State and Prospects of Historical Study; IV. On the Purposes and Methods of Historical Study; V. Methods of Historical Study; VI.-VII. On the Characteristic Differences between Mediæval and Modern History.

VI. Lavisse.—General View of the Political History of Europe. An admirable book for the teacher who can grasp its bold generalizations.

[From the author's Preface:—"This volume presents the sequence of the great phenomena of history, and it also attempts to give the *how* of things. It would be well to add the *why*, if it were not too bold an undertaking.

"Nature has written on the map of Europe the destiny of certain regions. She determines the aptitudes and, hence, the destiny of a people. The very movement of events in history creates, moreover, inevitable exigencies, one thing happening because other things have happened. On the other hand, nature has left, on the map of Europe, free scope to the uncertainty of various possibilities. History is full of accidents, the necessity of which cannot be demonstrated. Finally, there exists free power of action, which has been exercised by individuals and nations.

"Chance and freedom of action oppose alike the fatality of nature and the fatality of historical sequence. To what extent each of these four elements has influenced history cannot be determined with exactness. Still it may be interesting, at least, to attempt to accomplish something in this direction. My little volume invites the reader to make such an attempt."]

VII. Bunbury.—A History of Ancient Geography among the Greeks and Romans, from the Earliest Ages to the Fall of the Roman Empire. Two volumes with twenty illustrative maps.

VIII. Putzger.—Historischer Schul-atlas zur Alten Mittleren und Neuer Geschichte.

VIII. Gardiner. S. R.—A School Atlas of English History.

IX. Winsor. — Narrative and Critical History of [illegible] Spanish Explorations and Settlements from the Fifteenth to the Sixteenth Century; III. French Explorations and Settlements in North America, and those of the Portuguese, Dutch, and Swedes, 1500-1700; IV. The English and French in North America; VI.-VII. The United States of North America; VIII. The Later History of British, Spanish, and Portuguese America. This monumental work, prepared by specialists on the co-operative plan, is less valuable for its narrative than for its critical portions. For students who can handle such an apparatus, its critical essays, bibliographies, catalogues and descriptions of maps, and editorial notes are invaluable.

X. Lalor.—Cyclopædia of Political Science, Political Economy, and United States History. The articles on American History contributed to this Cyclopædia by the late Alexander Johnston are remarkable for clearness of insight and felicity of statement.

XI. Johnston.—History of American Politics. Third Edition Revised and Enlarged by Professor Sloane. A book that made its author a reputation.

XII. Gannett.—Boundaries of the United States and of the Several States and Territories, with a Historical Sketch of the Territorial Changes. Bulletin of the United States Geological Survey, No. 13.

XIII. Preston.—Documents Illustrative of American History, 1606-1868, with Introductions and References.

XIV. MacCoun.—A Historical Geography of the United States.

XV. Hart.—Epoch Maps Illustrative of American History.

XVI. Shaler.—Nature and Man in America.

I. THE EDUCATIONAL VALUE OF HISTORY.

Formal discussions of the educational value of History, or at least thorough ones, are hardly to be found in the English language. Valuable remarks, however, will be found in the following sources:

Bolingbroke: Letters on the Study and use of History; Diesterweg: Instruction in History, I. The Meaning of History, II. On the Use of History; Milton: Tractate on Education; Locke: Thoughts on Education; Carlyle: Critical and Miscellaneous Essays, History; Macaulay: Critical and Miscellaneous Essays, History, Hallam's Constitutional History of Europe, Mackintosh's History of the Revolution in England, 1688, and Mitford's History of Greece; Morley, John: Critical Miscellanies, Second Series, Popular Culture; Emerson: Miscellanies, History; Arnold, Dr. Thomas: Lectures on Modern History, Inaugural Lecture; Lecky: The Political Value of History, A Lecture; Spencer, Herbert: Education, I. What knowledge is of most worth? Wells, J: The Teaching of History in Schools, An Oxford Extension Lecture; Stubbs: The Study of Mediæval and Modern History, (see particularly I. and

[illegible] first to try to [illegible] the subject into [illegible]

[illegible] Aboriginal America; II. (II.;) Howell: Education, I., 255, History in its Relation

to Practical life; Birrell: Obiter Dicta, The Muse of History; Adams, C. K.: Manual of Historical Literature, Introduction, On the Study of History; Schaff, Dr. Philip: History of the Christian Church, I., General Introduction, History of the Apostolic Church, General Introduction to Church History; Guizot: History of Civilization, *passim*; Jay: Papers of the American Historical Association, V., Nos. I.-2., The demand for Education in American History.

The pedagogical writers deal with the subject from their own point of view. The following have good remarks: Bain: Education as a Science, VII.; Compayré: Theoretical and Practical Pedagogy, Part II., Chap. V.; Currie, James: Principles and Practice of Common School Education, XII.; Fitch, Dr. J. G.: Lectures on Teaching, XIII.; Klemm, Dr. L. R.: European Schools, II.-III.

II. THE FIELD OF HISTORY.

Diesterweg, Spencer, Carlyle, and Macaulay: same references as previous section. Trevelyan: Life and Letters of Lord Macaulay, II., 299; Green, J. R: A Short History of the English People, author's preface to the original edition, and Mrs. Green's preface to the revised edition; McMaster: A History of the People of the United States, Introduction.

III. SOURCES OF INFORMATION.

Adams, C.K.: A Manual of Historical Literature (See the bibliographies); Adams, H. B. and others: Johns Hopkins University Studies, Eighth Series, XI.-XII., Seminary Notes on Recent Historical Literature; White: Papers of the Historical Association, I., No. II., On Studies in General History and the History of Civilization; Hart: The Academy, II., 367, A List of General Readings in the History of the United States; Hall: Methods of Teaching History (See the bibliographies;) Gordy and Twitchell: A Pathfinder of American History (Numerous lists of well selected books); Davidson, Hannah A: Reference History of the United States; Barnes, Mary Sheldon: Studies in General History, Studies in Greek and Roman History, Studies in American History; also Teachers' Manuals and Aids.

IV. THE CHOICE OF FACTS.

See references section II. Also the following: Hall: Methods of Teaching History, particularly Introduction, and Methods of Teaching History, by Dr. Adams; Freeman: Methods of Historical Study; Klemm, Spencer, Bain, Compayré, Fitch, and Currie: references previously given; Ransome: Elementary History of England; The Journal of Education (London), February, 1891 (pp. 86-87).

V. METHODS OF TEACHING.

Hall, Freeman, Klemm, Compayré, Currie, Fitch, Mrs. Barnes, Gordy and Twitchell, and Davidson: previous references. Bain: Education as a Science, VIII., Practical Essays, VII., The Art of Teaching; Trainer: United States History by the Brace Method; Prince: Methods of Instruction and of Organization of the Schools of Germany, X.; Foster: The Seminary Method of Original Study in the Historical Sciences, as Illustrated from Church History; Fling: The Academy, IV., 129, 212, The German Historical Seminary. (These articles are clear and interesting accounts of the Seminary organization and methods of Professor Maurenbrecher, of Leipsic); Fredericq: Johns Hopkins University Studies in Historical and Political Science, Fifth Series, X., Eighth V., VI., X. Notes and Impressions Concerning Advanced Instruction in History in England and Scotland, The Study of History in Germany and France. The Study of History in Belgium and Holland. Adams, H. B: Johns Hopkins University Studies in Historical and Political Science, Second Series, I., II., Special Methods of Historical Study and New Methods of Studying History; White: id., Fifth Series, XII., History and Politics; Adams, C. K: Papers of the American Historical Association. IV., I., Recent Historical Work in the Colleges and Universities of Europe and America; Schouler: Papers of the American Historical Association, IV., III., The Spirit of Historical Research; Rollins: The Academy, I., 133, American History in Preparatory Schools; Hart: Id., II., 256, 306; History in High and Preparatory Burgess: Id., III., 293, A Method of Teaching College Preparatory History; Barnes, Mrs.: Id., IV., 285., General History in the High School: Hudson: Id., III., 310, History and Political Science; Salmon, Lucy M: Id, V., 283, Teaching of History in Academies and Colleges; Winterburn: Id., VI., 510; History Work in High Schools; Tout: The Educational Review, III., 199, A Short Analysis of English History; Hughes: Education, II., 410; Topical Teaching of History; Porter: Id., III., 136; The Study of History; Greenwood: Id, IV., 623, Teaching History; Fisher: Id., VI., 588, Universal History; Judson: Id., VI., 19, Teaching History in Secondary Schools; Hall: Id., VII., 470, History of the Civil War, What and How Much Shall be Taught? Thorpe Id., VII., 686, Teaching American History; Gardner, Ida M.: Id., VIII., 547, 663, IX., 35, 109., Outline Notes of the Renaissance of the Reformation; Lowrey: Id., VIII., 447, Philosophy of State and of History; Thorpe: Id., VIII., 351, History and Economics in Manual Training Schools; Wallace: Id., IX., 346, Study of History through Biography; Mowry: Id. IX., 134, Teacher's Independent Study of History; MacKibbin: Id., X., 159, Outline Course of Study of History.

[The paragraphs quoted below are taken from Dr. Alexander Bain's essay, "The Art of Study" mentioned above.

"Our first maxim is—'Select a Text-book-in-chief.' The meaning is that when a large subject is to be overtaken by book-study alone, some one work should be chosen to apply to, in the first instance, which work should be conned and mastered before any other is taken up. There being, in most subjects, a variety of good books, the thorough student will not be satisfied in the long run without consulting several, and perhaps making a study of them all; yet, it is unwise to distract the attention with more than one, while the elements are to be learnt. In Geometry, the pupil begins upon Euclid, or some other compendium, and is not allowed to deviate from the single line of his author. If he is once thoroughly at home on the main ideas and the leading propositions of Geometry, he is safe in dipping into other manuals, in comparing the differences of treatment, and in widening his knowledge by additional theorems, and by various modes of demonstration.

"Undoubtedly, the best of all ways of learning anything is to have a competent master to dole out a fixed quantity every day, just sufficient to be taken in, and no more; the pupil, to apply themselves to the matter so imparted, and to do nothing else. The singleness of aim is favorable to the greatest rapidity of acquirement; and any defects are to be left out of account, until one thread of ideas is firmly set in the mind. Not unfrequently, however, and not improperly, the teacher has a text-book in aid of his oral instructions. To make this a help, and not a hindrance, demands the greatest delicacy; the sole consideration being that the pupil must be kept *in one single line of thought*, and never be required to comprehend, on the same point, conflicting or varying statements. Even the foot-notes to a work may have to be disregarded, in the first instance. They may act like second author, and keep up an irritating friction.

"The subjects that depend for their full comprehension upon a certain method and order of details, are numerous, and include the most important branches of human culture The Sciences, in mass, are avowedly of this character; even such departments as Theology, Ethics, Rhetoric, and Criticism have their definite form; and, until the mind of the student is fully impressed with this, all the particulars are vague and chaotic, and comparatively useless for practical application. So, any subject cast in a *polemic* form must be received and held in the connection thereby given to it. If the arguments *pro* and *con* fall out of their places in the mind of the reader, their force is missed or misconceived

"History is pre-eminently a subject for method, and, therefore, involves some such plan as is here recommended. Every narrative read otherwise than for mere amusement, as we read a novel, should leave in the mind—(1) the Chronological sequence (more or less detailed); and (2) the Causal sequence, that is, the influences at work in bringing about the events. These are best gained by application to a single work in the first place; other works being resorted to in due time."

The question, "What is the best way to study?" is one that both learner and teacher consider far too little. It controls the question, "What is the best way to teach?" Dr. Bain lays down three fundamental propositions.

(1) In the early days of education, instruction must be narrow; (2) It must be thorough; (3) Only when the pupil is "thoroughly at home on the main ideas," only when "one thread of ideas is firmly set in the mind," only when "one single line of thought" has been wrought into the mental substance, should the teacher begin to be discussive and "broaden" the work. In History, what folly to fall to comparing, interpreting, and discussing before the pupil has amassed a store of facts on which to set his reflective faculties at work. In dealing with the history of a country or nation, the first thing to be done is to fix in the pupil's mind firmly the main points—an outline—a framework—in which he can dispose and arrange minor facts and details as he acquires them; or, to change, the figure, to provide his mind with a supply of hooks and pegs on which to hang up, in proper order and in due relation, new facts and ideas as he masters them].

VI. THE ORGANIZATION OF FACTS.

See previous references to pedagogical writers and historical specialists. Also Guizot: History of Civilization, *passim*; Mace: Papers of the American Historical Association, V., No. III., The Organization of Material. On "Organization" and "Systematization," see the current text-writers on Psychology.

VII. THE TIME RELATION IN HISTORY: CHRONOLOGY.

The best practical suggestions on the handling of dates are found in the pedagogical writers. Wells also has good remarks. See also Schaff and Carlyle, previous references; Freeman: Four Lectures on European History, and The Unity of History. For a division of our own history, Hart: The [illegible] American History [illegible] first to [illegible] the project [illegible]

[illegible] may be commended. The numerous chronological schemes and charts and dictionaries of dates give information rather than method. On the science of chronology and chronological systems, the articles on those subjects in the cyclopædias may be consulted.

VIII. CAUSE AND EFFECT IN HISTORY.

Flint, R: The Philosophy of History in France and Germany, (The Introduction contains a good general account of the development of the idea); Bunsen, Baron: Outlines of the Philosophy of History, (Compendious General Introduction;) Montesquieu: The Spirit of Laws; Buckle: The History of Civilization in England, Vol. I., chapter I.; Draper: The History of the Intellectual Development of Europe, I.; Guizot: History of Civilization; Lecky: The Political Value of History; Froude: Short Studies of Great Subjects, I., Is History a Science? II., Scientific Method Applied to History, Inaugural Lecture as Regius Professor of Modern History at Oxford, The Educational Review, V., 163; Smith, Goldwin: Lectures on the Study of History, I. An Inaugural Lecture, II.–III., On the Study of History, IV., On Some Proposed Consequences of the Doctrine of Historical Progress, V., The Moral Freedom of Man; Lavisse: General View of the Political History of Europe; Dabney: Papers of the American Historical Association, V., No. III., Is History a Science? Harris: Id., V., No. III., The Philosophical Aspect of History.

IX. PHYSICAL CAUSES THAT ACT IN HISTORY.

I. General. Reclus: The Earth and Its Inhabitants, with Numerous Illustrations and Maps. (Europe 5 vols., Asia 4 vols., Africa 4 vols., Oceanica 1 vol., North and South America 4 vols. The last four volumes are entitled, British North America, Mexico, Central America, and the West Indies, The United States, and South America.) The Earth, a Descriptive History of the Phenomena of the Life of the Globe, The Ocean, Atmosphere, and Life, being the Second Series of a Descriptive History of the Life of the Globe; Guyot: Earth and Man; Montesquieu: The Spirit of Laws, books XIV.–XVIII.; Buckle and Draper: Titles before given, *passim*; Bryce: History and Geography, The Contemporary Review, XLIX., 426; Mackinder: On the Scope and Methods of Geography, Proceedings of the Royal Geographical Society., IX., New Series; Freeman: Historical Geography of Europe, Introduction; Curtius: History of Greece, Book the First, I., Land and People; Thirlwall: History of Greece, I., Geographical Outlines of Greece; Smith, Dr. W: A History of Greece, Introduction; Lanciani: Ancient Rome in the Light of Recent Discoveries, II., The Foundation and Prehistoric Life of Rome; Smith, Goldwin: Lectures and Essays, The Greatness of the Romans, The Greatness of England, (these essays, first published in The Contemporary Review, are excellent); Taine: History of English Literature, Introduction, Art in Greece, 7–72; Green: A Short History of England, The Making of England, A Short History of the British Islands; Huxley: Physiography; Mill: The Realm of Nature, An Outline of Physiography, XVII., Man in Nature; Shaler: Physiography of North America, Introduction to the Narrative and Critical [illegible] [illegible] averaging 25.00 per cent. of their weigh [illegible] History of America, IV., Nature and Man in America

(both excellent); Burgess: Political Science and Constitutional Law, Book I., Chap II., The Present Geographical Distribution of Nations and Nationalities, III., National Political Character, IV., Conclusions of Practical Politics from the Foregoing Considerations in regard to Physical, Ethnical, and Political Geography, and National Characteristics; Mahan: The Influence of Sea Power upon History, 1660–1783, The Influence of Sea Power upon the French Revolution and Empire, 1793–1812. A distinguished foreign critic has called the author of these works the creator of the philosophy of naval history.

["There was a certain advantage arising from the hemming in of the British Colonies in North America by the Appalachian boundary. In place of the detached settlements which characterized the Spanish, and more particularly the French plantations, the British Colonial establishments were, by their geographical conditions, compelled to develop in a more connected way. It was possible in 1700 to ride from Portland, Maine, to Southern Virginia, sleeping each night in some considerable village. If our ancestors on the continent had secured a ready access to the interior, it is likely that a hundred years [more] would have gone by before the colonists became sufficiently dense in population to permit the interactive life which prepared the way for the American Revolution."—Shaler: Nature and Man in America, 199.]

X. HUMAN CAUSES THAT ACT IN HISTORY.

Aristotle: The Politics, VII., 7; Flint: The Philosophy of History in Germany and France, Introduction; Guizot, History of Civilization; Lecky: History of the Rise and Influence of the Spirit of Rationalism in Europe, Introduction, The Political Value of History; Carlyle: Heroes and Hero Worship; Buckle, Draper, Bryce, Mackinder, and Lavisse, as before.

Marsh: The Earth as Modified by Human Action (Title of First Edition, Man and Nature), Introduction, II., Transfer, Modification, and Extirpation of Animal Forms, III., The Woods; IV., The Waters; V., The Sands; VI., Projected or Possible Geographical Changes by Man. The object of this work, as stated by its author in the preface, is: "To indicate the character, and approximately the extent, of the changes produced by human action in the physical conditions of the globe we inhabit; to point out the dangers of imprudence, and the necessity of caution in all operations which, on a large scale, interfere with the spontaneous arrangements of the organic or inorganic world; to suggest the possibility and the importance of the restoration of disturbed harmonies and the material improvement of waste and exhausted regions; and incidentally to illustrate the doctrine that man is, in both kind and degree, a power of a higher order than any of the other forms of animated life, which, like him, are nourished at the table of bounteous nature."

XI. THE HISTORICAL METHOD.

Sidgwick: The Historical Method, Mind, XI., 203; Freeman: Comparative Politics, I., The Unity of History, The Growth of the English Constitution; Maine, Sir H. S: Village Communities, I., The Effects of Observation of India on European Thought, Rede Lecture, Miscellanies, also printed separately; Max Müller: The Science of Language, First Series, I., [illegible] IV., V.

XII. THE TEACHER'S QUALIFICATIONS.

[Mr. John Morley (Critical Miscellanies: France in the Eighteenth Century), discussing the relative value of political preparation and literary preparation for writing history, makes some remarks that are equally pertinent to the teacher of history.

"It would, perhaps, not be too bold to lay down this proposition: that no good social history has ever been written by a man who has not either himself taken a more or less active part in public affairs, or else been an habitual intimate of persons who were taking such a part on a considerable scale. Everybody knows what Gibbon said about the advantage to the historian of the Roman Empire of having been a member of the English Parliament and captain in the Hampshire grenadiers, Thucydides commanded an Athenian squadron, and Tacitus filled the offices of prætor and consul. Xenophon, Polybius, and Sallust were all men of affairs and public adventure. Guiccardini was an ambassador, a ruler, and the counsellor of rulers; and Machiavel was all these things and more. Voltaire was the keen-eyed friend of the greatest princes and statesmen of his time, and was more than once engaged in diplomatic transactions. Robertson was a powerful party chief in the Assembly of the Scotch Church. Grote and Macaulay were active members of parliament, and Hallam and Milman were confidential members of the circles where affairs of State were the staple of daily discussion among men who were responsible for conducting them to successful issues. Guizot was a prime minister, Finlay was a farmer of the Greek revenue. The most learned of contemporary English historians a few years ago contested a county, and is habitually inspired in his researches into the past by his interest in the politics of the present. The German historians, whose gifts in reconstructing the past are so valuable and so singular, have for the most part been as actively interested in the public movements of to-day, as in those of any century before or since the Christian era. Niebuhr held more than one political post of dignity and importance; and of historical writers in our time, one has sat in several Prussian parliaments; another one, the tutor of a Prussian Prince, has lived in the atmosphere of high politics; while all the best of them have taken their share in the preparation of the political spirit and ideas that have restored Germany to all the fulness of national life and exaltation.

"It is hardly necessary to extend the list. It is indeed plain on the least reflection that close contact with political business, however modest in its pretentions, is the best possible element in the training of any one who aspires to understand and reproduce political history. Political preparation is as necessary as literary preparation. There is no necessity that the business should be on any majestic and imperial scale. To be the guardian of the poor in an East End parish, to be behind the scenes of some great strike of labor, to be an active member of the parliamentary committee of a Trades Council, or of the executive committee of a Union or a League, may be quite as instructive discipline as participation in mightier scenes. Those who write concrete history, without ever having taken part in practical politics, are, one might say, in the position of those ancients who wrote about the human body without ever having effectively explored it by dissection. Mr. Carlyle, it is true, by force of penetrating imaginative genius, has reproduced in stirring and resplendent dithyrambs the fire and passion, the rage and tears, the many-tinted dawn and blood-red sunset of the French Revolution; and the more a man learns about the details of the Revolution, the greater is his admiration for Mr. Carlyle's magnificent performance. But it is dramatic presentation, not social analysis; a masterpiece of literature, not a scientific investigation; a prodigy of poetic insight, not a sane and quantitative exploration of the complex processes, deeplying economical, fiscal, and political conditions that prepared so immense an explosion]."

XII. HISTORICAL GEOGRAPHY: THE OLD WORLD.

Freeman: The historical Geography of Europe, Text and Maps, Methods of Studying History, Geography and Travel; Smith, Dr. W.: Dictionaries of Greek and Roman Geography, and of The Bible; Stan- [illegible]

Bryce: The Holy Roman Empire, Appendix D; Green: A Short History of the English People, The Making of England; Ransome: Elementary History of England; Taylor: Names and Places; Putzger: Historischer Schul-Atlas; Keith Johnston: Physical, Historical, Political, and Descriptive Geography; Gardiner: A School Atlas of English History.

XIII. HISTORICAL GEOGRAPHY: THE NEW WORLD.

1. Discovery and early Exploration.—Bancroft's, Hildreth's, and Bryant and Gay's Histories; Winsor: Narrative and Critical History of America, II., III., IV., Christopher Columbus, IX.-XIX., Appendix, The Geographical results; Fiske: The Discovery of America, V., VI., VII., XII.; Scaife: America, Its Geographical History, 1492-1829; Parkman: The Pioneers of France in the New World.

2. Interior and Western Exploration.—Winsor, as above; Parkman: Series entitled France and England in North America; Whitney, J. D: The United States, Appendix, A. B., Names and Places.

3. Maps.—MacCoun: The Historical Geography of the United States, Historical Charts of the United States; Hart: The Epoch Maps.

4. Miscellaneous.—Lodge: A Short History of the English Colonies; Poore: The Federal and State Constitutions, Colonial Charters, etc.; Taylor: Names and Places; Coxe: American Geographical Names, The Forum, IV., 67; Redway: Manual of Geography.

ABSTRACTS OF THESES PRESENTED BY CANDIDATES FOR THE MASTER'S DEGREE.

THE UNION PACIFIC RAILWAY.

An abstract of a thesis entitled "The Union Pacific Railway," by John P. Davis, A. B. (University of Michigan), candidate for the degree of A. M.

The five chapters are: Introduction, Inception of the Pacific Railway Project, Asa Whitney, Sectionalism and Localism, and Acts of 1862 and 1864.

Sixty years of experience with railways has shown that the principle of free competition cannot be relied on to provide an equitable division of the benefits of railways as industrial agents, between the public and the owners of railways. The first step in discovering the true principle on which to base such an equitable division of benefits is a critical study of the facts or data of the railway problem—the railways themselves.

The project of a railway from the Atlantic to the Pacific had its inception—as far as known—in 1832, and the first proposition, put forth in that year, was in "The Emigrant," a newspaper published in Washtenaw County, Michigan (territory). Published suggestions became common in 1840.

"A narrative of the life of Asa Whitney from 1840 to 1850 is the history of the development during that period of the Pacific Railway project." He was the first to try to carry the project into eff[illegible] so as to furnish an attractive and re[illegible] peatedly petitioned Congress for a grant of land with which to build the railway. His scheme contemplated individual ownership of the completed work, and he maintained a systematic and persistent agitation of the scheme throughout the country, in and out of Congress and the State legislatures.

From 1850 to 1860 a Pacific railway, to be built at the expense of the United States, or with its aid, was generally desired, and the desire found frequent and positive expression in the platforms of political parties, the messages of presidents, and attempted legislation by Congress. But the conflicting interests of the North and South, and the jealousies of the great cities and Western States, for the control of the route and termini, prevented a realization of the universal desire.

In 1862 and 1864 acts granting liberal government aid for the construction of the Union Pacific and Central Pacific railways were passed, as the long agitated project had become identified with the efforts to procure National unity, and the secession of the Southern States had removed from Congress its principal opponents.

NITROGEN COMPOUNDS.

Following is an abstract of a thesis entitled "The Nitrogen Compounds of Milk and their Loss in the Making of Cheese," by A. L. Knisely, B. S. (University of Michigan), candidate for the degree of M. S.

The thesis is based upon experimental work by the author chiefly in 1892, at the New York State Agricultural Experiment Station, Geneva, N. Y. Mr. Knisely made at the station, a series of analyses of milk, cheese, and whey, in conjunction with quantitative experiments by expert cheese-makers at five cheese-factories in several counties of the State. The analyses were made for caseine, albumen, fat, total solids, and water. The averages represent 214,684 pounds of milk in 1500 lots, and over 3000 direct analytical estimates were made. The work had the supervision of the chemist of the station, Prof. L. L. Van Slyke. The inquiry is directed to the chemical character of the proteids of milk, their changes in treatment with rennet, and their consequent losses in production of cheese. Literature bearing directly upon the inquiry is meagre. The original authorities cited include Duclaux, König, Söldner, Chittenden, and Conn. The French reports of Duclaux bear directly upon the inquiry in respect to European milk, and the Yale studies of Professor Chittenden have important indirect bearings.

The outline of the thesis presents (1) the purpose of the investigation, (2) a resumé of our knowledge of the composition of milk, and (3) the chemistry of rennet, (4) American method of making cheese, (5) the author's methods of analysis, (6) tabulated statements of the materials subjected to analysis, (7) the analyses tabulated, (8) tables of condensed data, (9) discussion of the results as bearing upon several chemical and industrial questions, (10) conclusions, and (11) citations of authorities. The loss of proteids was found to be 20.48

being an average of 0.75 per cent. of the milk. An incidental contribution of some importance is made by the author in his analyses of the milk itself, his averages being in per cent. as follows: water 86.09; solids, 11.47; fat, 3.04; caseine, 1.73; albumen 0.55; sugar, ash, and remainder, 5.32.

ROMANTICISM AND HEINE.

An abstract of a thesis entitled "The Influence of the Romantic School in Germany upon Heinrich Heine," by J. A. C. Hildner, A. B., (University of Michigan, '90), candidate for the degree of M. A.

In the latter part of the 18th century, there arose in Germany what is called the Romantic School, which was a reaction against the 18th Century "Verstand" worship exemplified in Nicolai or the love of mediocrity as we find it in the writings of Kotzebue, and the immoderate use of Greek art forms by Goethe and Schiller. The principal part of the programme of the Romantic School was an unbridled Fichtean subjectivism. From Fichte's philosophy, although in direct opposition to its spirit, was deduced the principle of "Romantic irony." According to the Romanticist, the I creates morality and right. Humanity is vulgar, all excepting the subjectivity of the I. The mind of an artist who carried out such a principle in poetry and in life must necessarily become morbid. "Romantic poetry," Frederich Schlegel says, "is infinite, just as it is alone free, and recognizes as its first law that the sovereign will of the poet should suffer no law above it." Fancy became the ἐν καὶ πᾶν of the Romantic School, and nature was filled with creations such as demons, fairies, mountain spirits, brownies and nymphs. A pantheistic view of nature at first, it finally changed into a fatalistic one. The Romanticists allowed fancy to regulate the form as well as the content of their poetry. The result was a fantastic combination of the lyric, epic, and dramatic elements of poetry. Most of the Romanticists sang of the chivalry of the Middle Ages, and showed also a decided preference for the Catholic Church. They introduced new metrical forms, studied the literature and language of India, and revived the folk-song, especially by the collection "Des Knaben Wunderhorn."

Heine was born when the Romantic School was in its most flourishing condition. He inherited a romantic disposition from his father, and delighted in the legends and fairy tales of the Rhineland. Düsseldorf, his native city, was Catholic; his first instruction was received from Catholic priests. He read Uhland in his youth. He had a romantic attachment to Sefchen, an executioner's daughter, whose mother old him many tales of horror. In 1820 he joined the manticists at Bonn, where A. W. Schlegel was lec- g with the greatest enthusiasm. At Berlin he was sted in Franz Bopp's lectures on the literature of Heine carried out the principle of irony in and life. He made his own the Romantic ethics, eveloped them into St. Simonianism. This Ro- [illegible] misfortune in love, made him the poet of "Weltschmerz." His fancy roams in the same field as that of the Romanticist. He shows the same delight in mythology, the same love for the fantastic and horrible, for dreams and transformations. He has appropriated to himself the Romantic device of "Natur beseelung." He imitates Werner and Tieck in their fatalistic view of the world. He confuses the lyric, epic, and dramatic forms of art. He even draws inspiration from individual poems of the Romanticists. His preference for the Middle Ages is extremely meagre. His Catholic tendency is a *predilection d' artiste*. He follows the Romantic School in its use of the Sonnet. He sings of the blue waters of the Ganges. The "Wunderhorn," Uhland and Müller suggest to him his favorite metre, and give his songs their folk-like simplicity. From the "Wunderhorn," he culls expressions and ideas, and learns many devices. He says: "I ought to have included in my account of the Romantic School a review of my own writings."

THE BEGINNINGS OF SATIRICAL POETRY IN ENGLAND.

The following is an abstract of a thesis by Ellen Elizabeth Garrigues, A. B., (of the University of Michigan), candidate for the degree of A. M.

A sketch of the derivation and history of the word "satirical" leads to a brief discussion of the basis of satire. When the analytic or critical faculty of the mind, perceiving the contrast between the imperfect in the objective world and the ideal presented by the constructive imagination, expresses this contrast in terms which are contemptuous and witty, the expression is satire, which becomes literature when given adequate literary form. As the critical faculty is a fundamental element of the mind, and as the imperfect is co-existent with man, the materials for satire are always present; and when a nation begins to delight in expression for its own sake, crude attempts in this direction appear. These attempts are usually lyric in tone, and artistically without value. A cursory survey of satire in general, combined with a close study of satirical poetry in England before the seventeenth century, shows that the critical faculty has always sought to express its contempt for the ugly in lyric, epic, and dramatic poetry, as the constructive faculty has attempted to realize its ideal of beauty in these forms; the Margites and the Iliad, Aristophanes and Æschylus, Renard, and the Arthurian Romance, the *sirvente* and the low song, Moliere and Shakespeare, express these two sides of the mind and aspects of the world. Classic satire as a distinct *form* developed by the Romans should be carefully distinguished from the more natural forms which have been mentioned. It appears only in literature affected by Roman influence, and in a highly conventional period of letters.

The body of the thesis is a study of satirical poetry in England from its first recorded forms late in the [illegible] tury, up to its golden period in the sev- [illegible]

IV., V. [illegible] *gi, idepraedatores, debacchanidi.*

enteenth. Early satirieal songs in the vernacular, if they existed, are not recorded, and satire appears first in the mediæval epic and in Latin. The study of the Brunellus of Wireker and the Golias poems of Map is thus a study of European rather than English poetry; but these have much in common with great English poems which appeared later. After this brilliant period satire subsides into Latin, occasionally into Norman, and later into English songs, which criticise the Church, state, and national foes. These desultory outbursts gradually develop until they point to something better, which appears in the great work of Langland, in Gower, Chaucer, and a few powerful anonymous satires against the Church. The fifteenth century again shows an ebb-tide in literature, which returns in the shambling genius of Skelton. During the sixteenth century dramatic satire flourishes in the interlude and morality play, and later in the regular drama; while Wyatt introduces the classic satire diluted by Italian influence. His successors in the development of this form are Donne, Lodge, and Hall; while others write satire more or less affected by both the dramatic and the classic influences.

The paper closes with a brief eomment on the artistic valne of satirieal writing.

CARTESIAN AND KANTIAN IDEAS OF GOD.

Abstract of a thesis entitled "The Cartesian and the Kantian Ideas of God," by A. B. Storms, (University of Miehigan), candidate for the degree of A. M.:

Doubt is Deseartes's organon of philosophical inquiry. Beginning with *Cogito ergo sum*, he builds his system upon a purely subjective basis till, from the perfection of the idea of God in thought, he concludes that God exists. He likewise concludes the metaphysical and moral attributes of God.

Kant's idea of God must be approached through the two main branches of his critical philosophy, the Critique of Pure Reason and the Critique of Practical Reason. Kant's first inquiry is for an *a priori* synthetic element in knowledge. The conditioning "forms" of knowledge are space and time. Knowledge is limited to phenomena. The "ego" and "God" are transcendental ideas only. Kant banishes the God of deism, and adduces metaphysical arguments for the existence of God. He makes the "categorical imperative" the starting point of his practical philosophy. The writer treats the "good will" and the *summum bonum*. The critique of practical reason results in an extension of knowledge in a praetical sense only.

THESES: (1) By banishing the mechanieal conception of God, Kant paves the way for a possible reconstruction of Descartes's argument, such that it may have validity; (2) Descartes's argument for the existenee of God is based upon purely subjective grounds, Kant's upon (morally) objective grounds; (3) both writers are optimistic; (4) dropping Kant's scaffolding and ignoring the abstraction of his eritique of pure reason, we see that he marked a real advanee in the philosophical eonception of God, and renders a real service to theology.

DIGESTIVE FERMENTS IN THE URINE.

Abstraet of a thesis entitled "Digestive Ferments in the Urine," by E. H. Robertson, Ph. B., (University of Miehigan,) eandidate for the degree of Ph. M.

The presence of digestive ferments in urine has been frequently demonstrated, but sinee it has been shown that many bacteria produce such ferments, no one has attempted to decide whether those found in the urine are actually eliminated by the kidneys or have their origin in bacterial growths developing in the fluid after emission. The object of this investigation has been to decide this point. The conclusions are as follows:

(1) The urine has a decided amylolytic action readily converting starch into sugar; (2) this amylolytic action varies during the day, being greatest in the morning, decreasing rapidly after meals, then gradually rising, and reaching its maximum in four or five hours; (3) sterilized urine, acidified with HCl and placed in favorable conditions, will convert blood fibrin into soluble proteids, which shows a peptic action; (4) sterilized urine, rendered alkaline with a soda solution and placed in favorable conditions, will not change the appearance of blood fibrin, or convert it into soluble proteids, which shows the absence of a tryptic action; (5) urine and milk placed in favorable conditions never give a coagulation due to rennet ferment; (6) urine acidified with HCl never coagulates milk, unless the acid added is more than sufficient of itself to eoagulate the milk at once, which shows the absence of a rennet ferment.

MEDICINE AND SURGERY.

DR. HERDMAN ON MEDICAL EDUCATION.

In a reprint of an artiele read before the Ameriean Academy of Medieine at its last meeting, Dr. W. J. Herdman, of the Department of Medieine and Surgery, gives a résumé of the ehanges that have been made in the methods of edueation in this department of the University during the past fifteen years.

"1st. An advance in the requirements for admission to what is equivalent to a first-class high school education, including Latin.

"2nd. A large increase in the amount of objective or *laboratory teaching*.

"3d. The substitution of a *graded course* of study after a rational order, with text-book guides, for the former method of repetitional eourses of didactic leetures.

"4th. *An increase in the time required for* the undergraduates to study within the college walls, *from two terms of six months* to *four terms of nine months*.

"5th. Grafting the medical course upon certain suitable academic courses, offered by the Department of Literature, Science, and the Arts in the University,

which the degrees of B. S. and M. D. may be obtained in a reasonable length of time."

The writer goes on to say that these advances represent the essential features of the newer medical education in the United States, and that in this onward movement this department of the University has been one of the boldest and most independent pioneers, guiding the profession to higher stages of learning and achievement, and for which it has not always received proper acknowledgment from the adherents of other schools. It will be seen that this newer education demands a more liberal expenditure of time and money, a broader knowledge, more familiarity with the technique of experimental research, and manual dexterity in handling the multifarious appliances which modern methods of diagnosis and treatment require. The present stage of modern medical education is intensely analytical. Time is consumed in searching the "heavens above, the earth beneath, and the waters under the earth," for the micro-organism whose life is hostile to that of animals and man. The chemical changes which life-processes involve, both constructive and destructive, are patiently and perseveringly pursued, the physiological and pathological phenomena exhibited by the animal organism in its infinity of actions are figured, weighed, measured, and recorded. The result will be the creation of a generation of pains-taking and critical observers and analysts, who will seek for demonstration and proof where once supposition and conjecture had full sway.

But the essayist goes on to inquire whether in this result medical education will have attained its highest mission; whether in its relation to the welfare of humanity it has not a still broader and more fruitful field to cultivate, and yet keep within the legitimate limits of medical science; and in answer to the query calls attention to the fact that there is a wide range of subjects not yet generally included in the curriculum of medical schools which should find entrance there. Hygiene should be taught in the fullest meaning of the term, covering in its scope of topics discussed all influences which tend to degrade the body or the mind.

The duty of the physician does not cease when he has discovered the nature of the disease from which the individual suffers, and does all in his power to cure him, but he must be able and ready to point to the remote causes which led to the disease, and to suggest such means as may most successfully counteract the evil at its source. So educators of the future physicians must so enlarge their curriculum as to embrace a discussion of the disease aspect of those social and moral evils, a right understanding of which is the first step toward their correction.

UNIVERSITY SOCIETIES.

THE PHILOLOGICAL SOCIETY.

At the ninth meeting March 30, Prof. B. L. D'Ooge presented a paper on the Osean Dialect.

Prof. Rolfe suggested a new explanation of [illegible] IV., V. [illegible] *gi, idepraedatores, debacchanidi.*

These three words occur in the fragment of the Preamble to Diocletian's Edict *De Pretiis Rerum Venalium*, discovered at Plataea in 1889. In the publication of the inscription by Rolfe and Tarbell in the American Journal of Archaeology (vol. v. No. 4) these three forms were explained as errors in writing, i. e., *i* was written for *d*, and the mistake at once discovered. This view is supported by the form *detestaniam* in the same inscription, where *i* appears to be written for *d*, and by *tconferatur*, in which *t* is written for *c*, and the mistake corrected without erasure of the *t*.

But on the other hand, the forms used for *d* and for *i* are not enough alike to be easily mistaken for one another, while those for *c* and *t* are very much alike. It is possible too that *detestaniam* may be a mistake in writing for *detestanidam* instead of for *detestandam*.

In view of these circumstances a phonetic explanation was proposed: that in *idirigi* and *idepraedatores* we have isolated cases of the prothetic vowel, like those cited by Seelmann (*Die Aussprache des Latein* p. 318), and in *debacchanidi* an irrational 'help-vowel.' At any rate, it would seem that the first two words belong in the same category as those cited by Seelmann, whether they be regarded as isolated examples of the prothetic vowel or as errors in writing.

Dr. Rhoades also read a paper on "The Tragic Guilt in Schiller's *Maria Stuart*."

At the tenth meeting, April 13, Professor W. M. Arnold read a paper on Semitic Words in Greek.

At the eleventh regular meeting, May 11, Mr. Weeks read a paper on the Registration of the Movements of the Soft Palate.

To obtain a record of the movements of the soft-palate in speech has always presented great difficulties, and for two reasons: (1) the palatal veil in the making of nearly all sounds is screened from sight by the lips or tongue, and (2) it is not easy to find any substance which will cling to the peculiar membrane of this veil and register its movements externally. In the method explained in the paper, connection with the veil was obtained by a sucker of prepared plaster-of-paris cast on ferro-type. This sucker is placed just above the uvula, and clings with considerable tenacity. To this sucker is fastened with thread a loop of aluminium wire, bent much in the shape of a tennis-racket. The loop of this wire follows the contour of the teeth, and its sharp end, corresponding to the racket handle, extends beyond the lips. The tongue works up and down freely within this loop, which is drawn forward and backward between the rows of teeth by the soft-palate. On pronouncing a word with this loop in place, the end, which projects beyond the lips, is seen to move rapidly forward and backward. Its range of movement is within 1 c. To connect this moving wire with a kymograph by means of the Morey tambours is a matter of comparative ease. The result is a sort of script traced on smoked paper, which indicates clearly whatever movements the soft palate has gone through. This presents [illegible] simple means of investigating the movements of the soft palate during the formation of nasal

consonants, the French nasal vowels, and the "nasal twang."

The paper, with reproductions of some of the tracings, will be published in volume II. of Harvard Studies and Notes in Philology and Literature.

May 15, there was delivered, under the auspices of the Society, an address on Folk-lore, by Mr. W. W. Newell, of Boston, Secretary of the American Folk-lore Society.

TEACHERS' COURSES ANNOUNCED IN THE CALENDAR.

Department.	Instructor.	Semester.	Subject.	No. hours.
Greek	Prof. D'Ooge	First	Lectures on Greek Grammar	2
"	"	Second	Greek Prose Composition	2
Latin	Prof. Rolfe	First	Cæsar	2
"	"	Second	Vergil	2
French	Prof. Walter	"	Teachers' Course	2
German.	Prof. Thomas	First	German Literature and Composition	3
"	"	Second	Pedagogical Discussions	3
English	Prof. Hempl	First	Historical English Grammar	2
Science & Art of Teach'g.	Prof. Hinsdale	First	Practical	4
"	"	"	History of Education	3
"	"	"	School Supervision	3
"	"	Second	Theoretical and Critical	4
"	"	"	History of Education	3
"	"	"	Study of Educational Systems	2
"	"	"	Seminary	2
Mathematics	Prof. Beman	First	Algebra	2
"	"	Second	Geometry	2
Chemistry	Mr. Lichty	First	Laboratory Work	5

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